THE BENEFIT OF MUNI TO DOWNTOWN SAN FRANCISCO PROPERTY OWNERS

Gruen Gruen + Associates

DECEMBER 1981

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A Report to the
San Francisco City Attorney
and the
Public Utilities Commission

by

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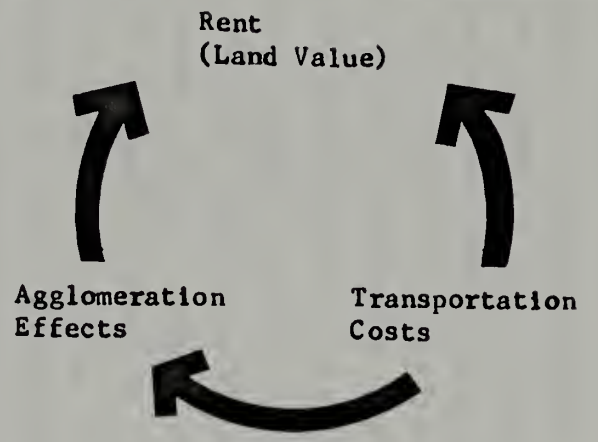
The value of land is derived from the actual or potential income (rent) from the use of that land: the more profitable the use, the more valuable the land. The uses that may be developed on land in any particular location depend on (1) physical factors, such as topography and availability of infrastructure, including transportation; (2) market factors, such as the demand for the specific use (the goods and/or services it provides) and the proximity of complementary and competing uses; and (3) governmental factors, such as zoning, which regulates the right to develop various types of uses and the physical characteristics of the manner in which they are developed.

The benefit that downtown San Francisco property owners derive from MUNI is related to all three of the factors identified above. The intensive MUNI service provided to the downtown area enables property owners to take advantage of the development densities permitted by the city's zoning code by developing their properties in a manner that serves the demand of businesses that seek to locate near other businesses in order to maximize efficiency (or profitability) and businesses that require a high level

FIGURE S-1

DYNAMICS OF CENTRAL PLACE LAND VALUES



Source: Gruen Gruen + Associates

of accessibility to maintain that efficiency (or profitability). MUNI enhances the benefits that these businesses obtain by locating near each other (that is, in an "agglomeration") by providing accessibility to both labor and customers/clients and by holding down the costs of congestion associated with high density land use.

The interrelationship among agglomeration, transportation costs and land value is illustrated in Figure S-1. Firms that benefit from agglomeration economies are willing to pay high rents to secure locations within the agglomeration. The cost of transportation affects a firm's ability to pay the rent required for a site within the agglomeration, and lower cost transportation - such as mass transit or sufficient concentration to make walking among sites feasible - leaves more money available for rent. In addition, where mass transit is available, it enhances the ability to use land intensively and therefore both increases land value and plays a role in creating the concentration of uses needed to facilitate walking and face-to-face communication (which in turn contributes to the ability of affected sites' owners to charge higher rents). This dynamic is demonstrated by the differential between downtown and suburban rents in cities with transit systems as compared to that differential in cities such as Houston and Los Angeles which have little mass transit; in the high correlation between downtown growth rates and public transit seat miles, found in a recent study by the Urban Land Institute*; and in the high correlation between the proportion of office space downtown

*Urban Land Institute, Office Development and Location (unpublished paper).

FIGURE S-2

Special Benefit Area

and public transit seat miles, also shown in the recent Urban Land Institute Study.

The special benefit that downtown derives from MUNI is defined as the increase in obtainable rents and land values in the downtown area that results from the extra level of MUNI service provided to that area, as outlined in Figure S-2. One important aspect of this extra service is that it enables firms to bring many more employees, customers and clients into a concentrated area than could be gathered using either the citywide average level of service or other means of transportation. It therefore allows downtown businesses to cluster very closely together - to maximize accessibility - while they minimize their costs of transportation and congestion and their need to provide parking facilities for their workers, customers and clients. The larger and more dense the cluster, the greater the obtainable rents and the higher the value of the land.

THE AMOUNT OF SPECIAL BENEFIT

The special benefit of extra MUNI service to property owners is, therefore, related to the increase in land values created by the interaction between transportation costs and agglomeration advantages. The size of part of this benefit may be readily quantified: to the extent that MUNI reduces workers' commute costs, it also reduces the wage levels required to obtain labor for businesses located within the agglomeration. It thereby increases

the amount of rent those businesses can afford (and are willing) to pay in order to retain their locations in the agglomeration. Since land value results from obtainable rents, the ability/willingness to pay higher rents creates higher land values. Therefore, the readily quantifiable portion of the special benefit is the savings in transportation costs that downtown workers realize by taking MUNI instead of commuting via other means of transportation.

The total value of the special benefit is not readily quantifiable. Some of its elements, however, are readily identifiable, and are listed below:

1. Savings in workers' transportation costs
2. Savings in customers' and clients' transportation costs
3. Increased accessibility between and among businesses
4. Minimization of need for street improvements to accommodate increases in workers, customers and clients
5. Minimization of need to provide parking facilities
6. Lower levels of congestion
7. Maximization of development potential
8. Maximization of feasible development intensity
9. Facilitation of continued growth.

These elements combine to create the increase in rents and land values within the downtown agglomeration, which owes its existence, in part, to the level of MUNI service it receives. The next several pages discuss the two portions (quantified and non-quantified) of the special benefit in turn.

Quantifiable Cost of MUNI Service Reduction

We have estimated the portion of the special benefit conferred by MUNI on downtown property owners that is relatively easy to quantify: the actual effect on out-of-pocket expenditures for transportation to work. Based on calculations of MUNI capacity, employment in the special benefit area outlined in Figure S-2 and the proportion of workers who commute via MUNI, it is estimated that MUNI currently carries 69,437 workers to the area each morning but could only carry 38,880 if service were reduced to the citywide average. Therefore, if MUNI service to the special benefit area were reduced to the citywide average, 30,557 workers would have to find alternative means of getting to work. If all these workers were to commute by automobile, their collective increase in annual commute costs - the costs of driving to work and parking minus the cost of riding MUNI - would total $49,694,959. The need to park their cars would require construction of new parking spaces that would have to be rented for a minimum of $205 per month; if rents on existing spaces rose to that level (as expected in a competitive market),

the additional increase in transportation costs - this one for current drivers - could be as little as $660,000 or as much as $41,400,000, depending on how many parking spaces there are and what the current average rent is. Together, then, downtown workers would experience an increase in transportation costs of $50,354,959 to $91,094,959. These added costs would be passed along to downtown firms, which would, as a result, have less money available for rent and would be less willing to pay the high rents demanded in the downtown conglomeration.

It is possible that, in the longer term, the residential locations of downtown workers would shift to take advantage of available capacity on other regional transit systems that serve downtown San Francisco; it is unlikely, however, that the future capacity of those systems will be adequate to carry the future workforce. By 1984, the number of jobs in downtown San Francisco is expected to increase by a minimum of 28,630. Available transit capacities, unused by current commuters, are projected to total 29,665 if all currently planned expansions are funded. If MUNI capacity serving the special benefit area is reduced to the citywide average, there will be a total of 59,187 additional workers seeking to commute via means other than MUNI (28,630 new plus 30,557 displaced from MUNI) and the available capacity will be sufficient to accommodate only 50 percent of them compared to 75 percent share currently accommodated by public transit.

The massive shifts in the residential distribution of downtown San Francisco workers required to effectuate this type of response to a reduction in MUNI service would not only increase transportation costs to downtown but would also greatly increase the other, difficult to quantify costs of such a service change. This increase in unquantified costs reduces the proportion of benefit accounted for by the estimated change in transportation costs. Such a shift would also result in an increase in all dollars spent on transportation to downtown - e.g., for shoppers - and create further ripple effects on land values there. For these reasons, we have not used this scenario of residential shifts to estimate the minimum benefit of MUNI service to downtown. If we had used this scenario, however, it would have yielded an estimated increase in commuters' transportation costs of between $38,960,360 and $79,700,300.

Unquantified Costs of a MUNI Service Reduction

The costs of a reduction in MUNI service to downtown San Francisco, estimated above, represent only part of the total benefit that downtown property owners derive from the service now provided. Other parts of the total benefit, which are associated with the benefits of agglomeration referred to earlier, are not quantified in this report. They are, however, identified in qualitative terms, and Figure S-3 lists the components of total benefit. Several of these factors are discussed in more detail below.

FIGURE S-3

TOTAL BENEFIT

Quantified benefit

\+ Customers' and clients' transportation costs

\+ Increased accessibility among businesses

\+ Lower levels of congestion

\+ Minimization of required streets and parking

\+ Maximization of density potential

\+ Maximization of feasible development intensity

\+ Facilitation of continued growth

Source: Gruen Gruen + Associates

Other Costs of Alternate Transportation

The increases in transportation costs estimated above represent the minimum costs of a reduction in MUNI service to downtown and therefore a minimum estimate of the special benefit downtown receives. Some of the additional costs are also associated with transportation to downtown. For example, the time and inconvenience of driving to work and parking are costs that cannot readily be quantified. A further cost is that of adapting the streets of downtown San Francisco to accommodate approximately 20,000 additional cars during the peak commute hours, which would include (at a minimum) the costs of new signs and intersection and traffic signal modifications. Another is the inability of some customers and clients to reach downtown if MUNI service is reduced, or their unwillingness to do so if congestion significantly increases.

Another significant cost is that of devoting more space in downtown San Francisco to parking facilities. The need to provide more parking would have two important effects. More immediately measurable would be the reduction in rents obtainable on the land used for parking. At the rate estimated for new parking spaces, rents for parking facilities would be approximately $7.00 per square foot per year; for comparison, office rents for existing buildings in the downtown area currently average $29.00 per square foot per year and retail rents $14.00.

While these figures cannot be directly translated into land values, because they do not account for operating expenses, they nevertheless provide a rough indication of the relative value of land devoted to the two types of uses.

A less immediately measurable benefit from the lack of need for parking facilities is the ability to maintain intensity of development and agglomeration and ease of accessibility within the downtown area. The concentration of businesses is less interrupted by non-contributing uses (parking), so walking trips among stores, offices and restaurants are easy to make and luncheon meetings and other face-to-face contacts are feasible to arrange. The nature of the agglomeration in this configuration, with fewer parking facilities, increases the benefits it confers on businesses located within it and, consequently, the attractiveness of the agglomeration itself, the rents those businesses are willing to pay and the land values derived from those rents.

Costs of Congestion

More important, however, in the long run are the costs of congestion added by automobile travel to the downtown agglomeration. Each new automobile increases the congestion in the benefit area; together, vehicles reduce bit by bit the attraction of the agglomeration because they increase transportation costs and decrease accessibility. As congestion in downtown San Francisco

becomes greater, the attraction of suburban business locations - such as Walnut Creek, Concord, Pleasanton, San Ramon and Burlingame - increases, because the combined costs of rent and transportation (including congestion) there are relatively lower than they were before.

In time, these suburban locations become not only relatively, but also absolutely more attractive than downtown San Francisco to increasing numbers of business firms.* New firms that may at one time have sought San Francisco locations locate in the suburbs instead; in addition, firms already in San Francisco whose leases have expired move out if their main functions are not critically tied to the city. Even if their main functions are critically tied to San Francisco, they will seek to move support functions to other areas where costs are lower and accessibility to their employment and customer/client bases is higher. Uses that serve workers and customers directly - i.e., stores, restaurants, hotels - also move out to take advantage of the activity at new locations. The induced processes of slowed growth and then attrition reduce the demand for space in the downtown agglomeration and the rents obtainable for that space. If demand remains low, some buildings become

*More specifically, suburban locations become more attractive to firms bound to the Bay Area. Corporate headquarters, in contrast, may find Los Angeles, Seattle or other west coast centers more attractive.

vacant and begin to deteriorate. Over time, the attraction of the downtown agglomeration has diminished, increasingly supplanted by the new suburban agglomerations.

CONCLUSION

The total benefit that downtown receives from the special level of MUNI service it receives is the increase in land value that results in the agglomeration MUNI helps to create. The portion of the benefit quantified in terms of workers' transportation costs is a small part of the benefit that downtown San Francisco gains from mass transit. The larger benefit hinges on the ability of the downtown agglomeration to function with the benefits of accessibility exceeding the costs of congestion. If MUNI service to the special benefit area cannot continue to provide that accessibility, the congestion costs that result will seriously detract from the ability of downtown to continue as an attractive and viable business center.

CHAPTER 1

THE SPECIAL BENEFIT OF MUNI SERVICE TO DOWNTOWN SAN FRANCISCO

THE NATURE OF SPECIAL BENEFIT

The value of land - and the amount of rent obtainable for commercial and industrial building space - in downtown San Francisco is significantly enhanced by the special level of MUNI service provided to that area. This enhancement is derived from the high level of accessibility afforded by MUNI. The types of uses that most often seek downtown locations are those that benefit from the accessibility (to information, to each other, to their mutually-attracted customers) permitted by high density land use arrangements. These uses are willing to pay high rents for that accessibility because it enhances their abilities to function efficiently and profitably. The relationship between this need for accessibility and the value of transportation was explained in 1926 by Robert Murray Haig:

> Rent appears as the charge which the owner of a relatively accessible site can impose because of the saving in transportation costs which the use of his site makes possible. The activities which can "stand" high rents are those where large savings in transport costs may be realized by locating on central sites where accessibility is great.*

*Haig, Robert Murray, "Toward an Understanding of the Metropolis", Quarterly Journal of Economics, May 1926, pp. 420-421.

The connection between land rent and transportation was restated by Ely and Wehrwein, quoting Von Thunen, in 1964:

> "If we investigate the reasons why site rent increases steadily toward the center of the city, we will find it in the labor saving, the greater convenience and the reductions of the loss of time in connection with the pursuit of business." In a word, accessibility means ease of contact. It is at the heart of the city that contact is secured with the least recourse to transportation. Transportation is costly in time and in the expense of overcoming friction.*

To understand the nature and magnitude of the special benefit conferred on downtown San Francisco by its special level of MUNI service, one must first understand the nature of agglomeration, of land value and of the interaction between the two. This chapter introduces those concepts and then goes on to describe the role of MUNI in facilitating the agglomeration of high density uses in downtown San Francisco.

THE NATURE OF AGGLOMERATION

All firms making the decision to locate within the central business district (CBD) do so because they expect to reap economic gains from their locational choice in excess of the price they must pay to remain in the

*Ely, Richard T. and George S. Wehrwein, Land Economics (Madison, The University of Wisconsin Press: 1964) pp. 444-45. Quote is from J.H. von Thunen, Der Isolierte Staat, written in 1826.

expensive central city. Economists have catalogued three specific types of gains to be derived from agglomeration:

(a) Large-scale economies within a firm enable the firm to maximize production efficiency. The proximity of markets, concentrated within the agglomeration, enables firms to enlarge to take advantage of scale economies in production.

(b) Localization economies for all firms in a single industry in a single location include their collective ability to support specialized services which enhance their efficiency and reduce their production costs, and the easy exchange of information needed to facilitate transactions.

(c) Urbanization economies for all firms in all industries at a single location, consequent upon the enlargement of the total economic size (population, income, output or wealth) of that location, for all industries taken together. These economies include both advantages in accessibility to labor and proximity to markets, which reduces shipping and sales costs.[1]

Firms in each type of land use reflect these types of agglomeration advantages. The modern office, for example, benefits from the agglomeration because it is a "machine for producing, processing, and trading specialized intelligence".[2] Unlike the goods produced by other

[1]The three descriptions are based on, and quote extensively from, Isard, Walter, Location and Space-Economy (Cambridge, The M.I.T. Press: 1956) p. 172.

[2]Hall, P., The World Cities, New York: McGraw-Hill, 1977, page 239.

industries, the information produced by the office industry has no discernable volume or bulk. Its production is also often unscheduled, thus maximizing the need for the frequency of informal contacts. The advantage of agglomeration for office user therefore lies in the fact that the larger the office community, the more information is available from nearby sources and the larger the labor pool on which it can draw.

A large economic community is also more capable of supporting the type of environment which serves to lure quality employees. A recent survey of the chief executives of firms which have relocated supports this observation.[1] Those corporations which moved from one central city to another ranked six factors as being of "high importance" in their decision to move: better variety of consultants and laboratories, better university or college, better cultural attractions, better entertainment, better access to airports and better environmental quality. All six of these factors facilitate the exchange of information and contribute to providing a climate suitable for attracting quality employees.

Retailing and industrial firms help create this climate and, at the same time, benefit from the central city agglomeration. Chamberlin notes that agglomeration economies in retailing range from the collection of a variety of goods - and arrangement of similar goods together - within a single store to the location of numerous stores in the same district.[2] Richardson

[1] Burns and Pang, "Big Business in the Big City: Corporate Headquarters in the CBD", Urban Affairs Journal, June 1977, page 541.

[2] Chamberlin, Edward H., The Theory of Monopolistic Competition (Cambridge, Harvard University Press: 1965) p. 262 ff.

explains that "the best sites will tend to be located near the point of greatest intracity accessibility" and that "agglomeration is more efficient because it minimizes shoppers' travel costs and time."[1] Retail firms rely on their relationship and proximity to the office agglomeration itself - to supply shoppers, to purchase products, to provide other business support services that could not be sustained by their demands alone - in addition to creating the environment that encourages the office growth to occur. Richardson notes, in this regard, that "complementary activities tend to agglomerate - offices and lunch bars, theaters and restaurants, wholesalers and transport firms."[2] Hotels also benefit from proximity to businesses, as nearby locations enable them to capture the business trade by providing accessibility to both business contacts and the restaurants, shopping and entertainment facilities of the downtown district. This pattern of location also takes advantage of the urbanization economies described earlier (page 17).

The benefits that industrial firms gain from agglomeration lie in those firms' abilities to share suppliers, support services, labor supply and customer pools. These factors are the localization and urbanization economies described on page 17. Just as electronics firms are drawn to the agglomeration of Santa Clara County's "Silicon Valley" to share the specialized labor supply

[1] Richardson, Harry W., Urban Economics (Middlesex: Penguin Books Ltd.: 1971) p. 36.
[2] Richardson, loc. cit.

and readily available customer base, garment manufacturers and tailors/alterations makers find it advantageous to locate in San Francisco near the downtown department stores, and printing companies locate near the office industries that require their services.

Residential uses, in contrast, do not benefit from the agglomeration. According to Haig, if there were no transportation costs, households would spread out evenly over an infinite, featureless plain, thereby minimizing the intensity of land use. Because there are in fact transportation costs, households must locate close to the business district; the closer they are situated, the lower their transportation costs and the greater the value of the land on which they locate. A decrease in transportation costs, however - such as that afforded by an improvement in mass transit - will reduce the land value of closer-in residential sites, because it will make location on farther-out sites more feasible. (This dynamic may be contrasted to the situation of commercial and industrial land uses, which seek to maximize the intensity of use, and therefore take advantage of decreases in transportation costs by investing the savings in higher rents for central locations.)

A healthy agglomeration is able to maintain unusually high business rents - and, therefore, high land values - because of the unique and valuable service it renders. As noted by Burns and Pang, "A central location facilitates - and is required for - the intellectual and economic commerce connecting the multitude specialized,

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TO WHOM IT MAY CONCERN:

Enclosed please find corrected pages #56 and 70 of the Gruen, Gruen and Associates report, The Benefit of Muni to Downtown San Francisco Property Owners.

Very truly yours,

Romaine A. Smith

Romaine A. Smith
Secretary

and serving as an employment center for the region" (C-3-O) and "a regional center for comparison shopping" (C-3-R).

Table 2-2 summarizes the specific uses permitted in each zone, and Table 2-3 (page 67) summarizes the density of development, expressed in terms of the allowable floor area ratio, in each zone.

Based on the descriptions reproduced in Table 2-1, the development density permitted in each, as summarized in Table 2-2, and the specific uses permitted in each zone, summarized in Table 2-3, all zoning districts allow the types of uses able to benefit from the agglomeration permitted by a high level of transit service. The residential zones are included in this list because they allow the development of medical offices. The commercial districts are included because they permit all types of uses that benefit from agglomeration. It may be noted that the C-2 zone is described in part by the code as follows:

> On a larger scale than the C-1 districts, they* provide convenience goods and services to residential areas of the city, both in outlying and closer-in, more densely built communities. In addition, some C-2

*The C-2 districts.

shown in Figure 2-6. Boundary lines were drawn after a visual inspection of the area, according to two criteria, both of which must apply to an area for it to be included in the district:

1. All land in the district must be within one-quarter mile of a MUNI route served by at least two bus lines that runs through a grid square included in the large contiguous area of squares with the highest 10 percent of capacity. As used here, "bus" is a generic term and refers to any MUNI mode. The 38 Geary line, which includes the 38, 38L, 38AX and 38BX routes, is considered to comprise "at least two" lines on the Geary-O'Farrell couplet.

2. All land in the district must be part of the downtown San Francisco agglomeration of businesses. This requirement means that the majority of uses in the included areas must be functionally linked to the downtown or serve a regional clientele. Wherever feasible, zoning district boundaries are used to define the edge of the agglomeration. Where zoning district boundaries were not available - for example, along Van Ness Avenue to the north and Market Street to the west - the district was limited to the area

interdependent units which comprise a contemporary business community."[1]

AGGLOMERATION AND LAND VALUES

Land Value

Land value is derived from the use to which land may be put and the economic return derived from that use. More technically, land value is the capitalized residual of building rents (the gross return from allowed land use) minus the sum of operating expenses and the expected return on the capital investment required to provide the building. Therefore, the more rent that can be obtained from uses on a particular site - either from a greater amount of rentable building space or a higher rent level or both - the greater the land value of that site.

Land Value and Transportation Costs

The actual demand for use on a particular site is a function of that site's location. The advantages or disadvantages of particular locations result in large part from their distance from or proximities to each other and the costs of moving among them.[2] If no location held any advantage over any other location and there were no costs of transportation among locations, then there would be no land value. "No costs of transportation" would be equivalent to a situation in which

[1] Burns and Pang, op. cit., p. 533.

[2] Other advantages or disadvantages are locationally fixed, such as the aesthetic appeal of San Francisco or the climate of Florida.

people or goods could travel any distance in no time at all; in that case, land values would remain zero or near zero as long as there remained any vacant land. Because there are in fact transportation costs, however, sites do acquire land value, and the sites with the highest values are those from which the transportation costs to defined destinations are the smallest. These high land values result from the high rents which may be charged at the sites with the minimum transportation costs. Because an agglomeration is "a machine" for minimizing the transportation costs of certain transactions, it is also a mechanism for maximizing rents (and, therefore, land values). This phenomenon is the same as that described by Haig in 1926 and quoted on page 1.

Haig's observations concerning the direct, one-for-one trade-off between the cost of transportation and obtainable rents are summarized by the following equation:

$$\text{Site rent} + \text{transportation costs} = \text{a constant} \quad (1)$$

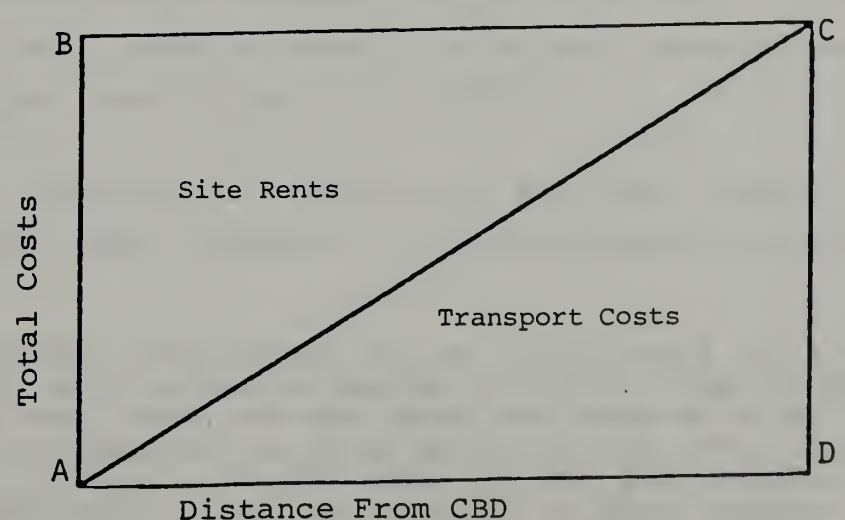
By site rent, Haig meant the price that an individual, a firm or any group is willing to pay to locate in one spot relative to another. For example, since offices require efficient transportation of both employees and information, they are willing to pay very high site rents in order to locate in central, easily accessible central business districts. Since retail stores seek locations

with high concentrations of population and benefit from clustering, they are also willing to pay the high rents required for CBD sites. Similarly, other information-sensitive or location-sensitive activities, including most commercial and industrial uses, require accessible central locations. Regina Belz Armstrong has quantified the strong tendency for these "information-sensitive" groups to locate in the CBD. A short walk through San Francisco's downtown area provides more than adequate confirmation of the hypothesis that financial, insurance and central administrative offices cluster in the CBD while hotels and retail stores cluster around the Embarcadero and Union Square, and industrial activities cluster south of Market Street. The high site rents users are willing to pay result in the phenomenally high land values in major CBD's.

Figure 1-1 graphically explains the relationship between transportation costs and site rents. The figure shows

FIGURE 1-1

The Relationship Between Site Rents and Transportation Costs



that transportation costs increase with increasing distance for the CBD, and that site rents therefore decrease with distance. The sum of the two remains constant, as stated by Haig. Figure 1-1 clearly shows why firms requiring less interaction choose to locate away from the CBD, while interaction-sensitive (and, therefore, transportation-sensitive) firms locate in dense agglomerations.

Figure 1-2 shows an interesting implication of equation (1), by showing that a uniform increase in the cost of transportation per mile, such as an increase in gasoline prices, will have two results. First, the effective radius of the city is shortened (from AD to AD') because it becomes relatively less economically efficient for individuals to commute long distances to work. Second, land values in the CBD increase because the increased cost of transportation increases the benefits of a central location. Note that because the total amount of money which firms and individuals have to spend on transportation and site rent tends not to change, the size of ABCD (old transportation costs plus site rents) exactly equals AB'C'D' (new transportation costs plus site rents). Thus, increases in gasoline and auto costs and other costs which increase the per mile cost of transportation will tend to result in higher density land uses and higher land values in the CBD.*

Figure 1-3 shows the impact of a different type of transportation cost increase. It illustrates the effects of

*Conversely, reductions in per mile costs of transportation, such as technological advances, highway improvements and "cheap energy policies pursued prior to the Arab oil embargo of 1973 and even for some time after that", played a large role in the suburbanization of American cities and the decline of many central cities that occurred after World War II. Urban Land Institute, (ULI), Office Development and Location, (unpublished paper).

FIGURE 1-2

The Effect of a Uniform Increase in Transportation Costs Per Mile

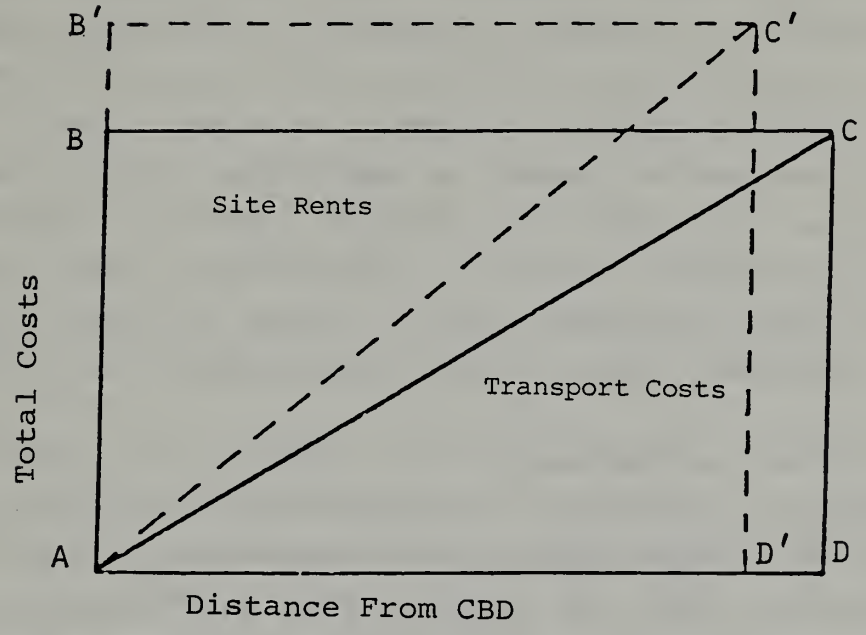
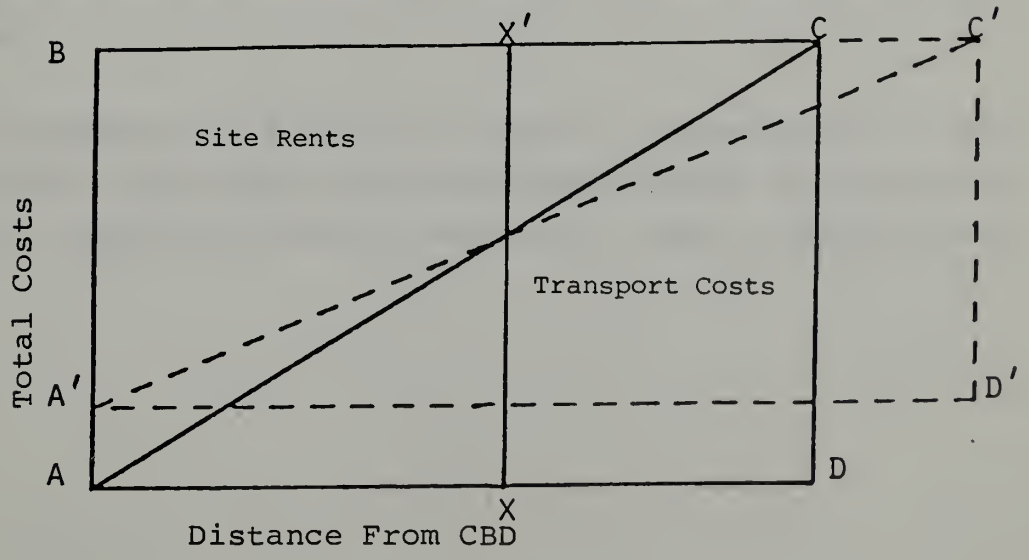


FIGURE 1-3

The Effect of a Permanant Reduction in Mass Transit Service to the CBD



an increase in the cost of travel - such as a reduction in mass transit - within and to the central business district that does not affect transportation costs at the city's periphery. Therefore, Figure 1-3 describes the special benefit that mass transport imparts to the CBD. In the case of San Francisco, a reduction in MUNI service to the CBD would lead to more cars and increased congestion - and, therefore, increased transportation costs - in the CBD, but would have no impact on the cost of transportation between Oakland and Berkeley, or between Walnut Creek and Richmond. In fact, transportation costs in the outlying areas of San Francisco would decrease relative to transportation costs in San Francisco.

Therefore, an increase in transportation costs to and from the CBD is equivalent to a decrease in transportation cost in and among all outlying areas. An increase in transportation costs within the CBD increases the minimum transportation cost (from A to A') and therefore decreases the maximum site rent (from AB to A'B). Because transportation on the periphery has become relatively less expensive compared to costs within the CBD, the effective radius of the city is increased (from BC to BC'). One result of this transportation cost change is that site rents between XX' and the new periphery increase.

The importance of Figure 1-3 cannot be overstated. The congestion resulting from decreased transit service to a central business district erodes the very foundation of

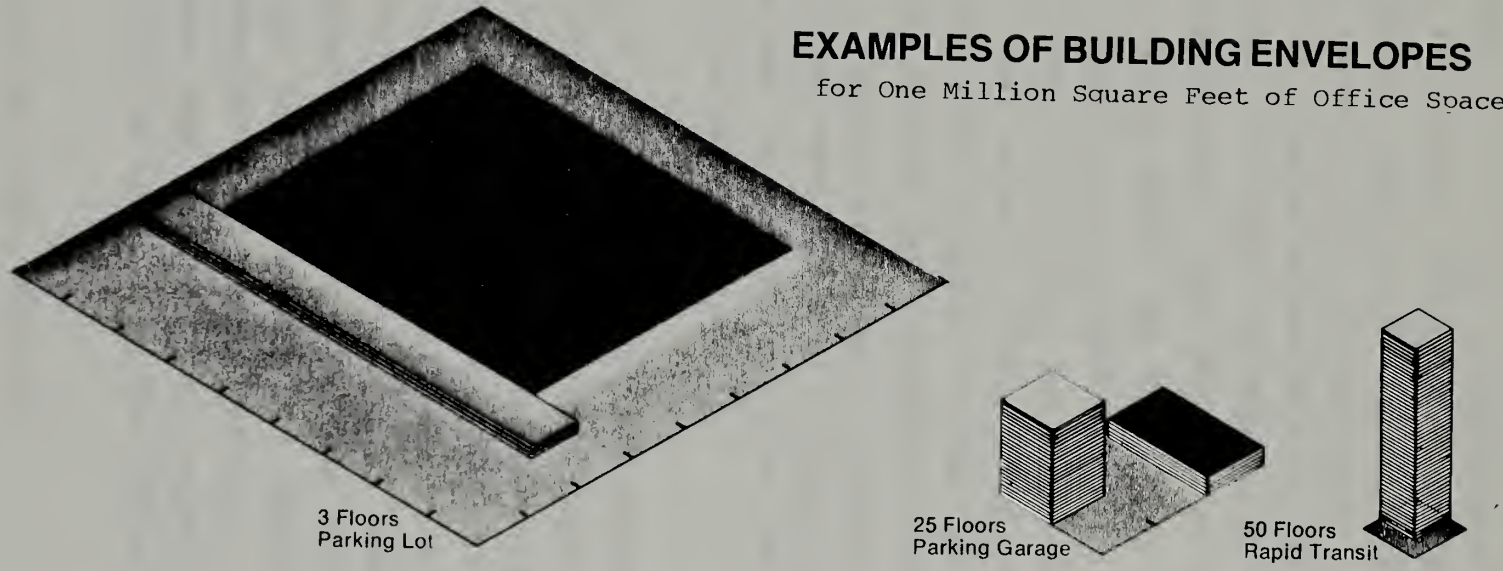
the benefits of agglomeration. Information is not as easily transmitted in a congested city, employees are relatively reluctant to endure extended commute trips into and home from work, and visitors to the downtown - including customers for many businesses - find it more difficult to come into the downtown.

Evidence and historical experience both clearly point to the conclusion that a well-developed mass transit system dramatically increases both an agglomeration's growth rate and land values within the CBD. Just as the development of the first successful electric streetcar in 1887 is seen as one of the major innovations leading to the development of the office industry,[1] transportation still plays an important role in agglomerations. Armstrong points out that the availability of mass transportation allows for concentration of the work force by allowing the construction of large buildings on small parcels of land. When the need for parking spaces is reduced, the intensity of land use - and, concomitantly, the value of the land - increases. The land requirements for buildings/employers of identical size, given different types of transportation availability, are illustrated in Figure 1-4, which clearly shows the increase in land development intensity (and, therefore, land value) afforded by the availability of mass transit.

Further, mass transit plays a major role in determining growth by simultaneously reducing congestion and widening the area from which employees can be drawn. In a study of office development, conducted by the Urban Land Institute (ULI), it was found that the number of seat miles of transit is strongly correlated to a CBD's growth rate.[2]

[1] Armstrong, op. cit., page 9.
[2] ULI, op. cit.

FIGURE 1-4



FAR = Floor Area Ratio

Source: Regina Belz Armstrong, The Office Industry: Patterns of Growth & Location (New York, Regional Plan Association: 1972).

One major effect of increased congestion is to induce firms to locate outside of the CBD. By locating in the suburban fringe of a large agglomeration, a firm can maintain contacts with information sources in the city while enjoying the benefits of lessened congestion, such as increased accessibility by employees and clients. A retail store can enhance accessibility for customers, who prefer the ease of fewer traffic problems and closer parking in the suburbs. The ability of mass transit to help central cities avert the flight of offices to the suburbs is evidenced by the fact that, in the ULI study, a strong positive correlation was found to exist between the number of seat miles of transit and the percent of a region's office jobs located in the CBD. Very strong support for the belief that congestion leads to offices' moving to the suburbs is found in a survey of corporate movers. The chief executives of offices "leaving central cities emphasized congestion as the major reason for their choice of a suburban site".[1]

A case study of three western cities over time performed by the Urban Land Institute provides additional proof of the role of transportation in facilitating concentrated office development. Although all three of the cities in the ULI case studies have experienced rapid growth, only in Houston, where mass transit is not stressed, has the rapid development taken place outside the CBD. The opposite has been true of Denver and Seattle, "where the continued expansion of transit service to the downtown has facilitated the office-based expansion's location downtown".[2] Data obtained from The Office Network, Inc.,

[1] Burns and Pang, op. cit., page 542.
[2] ULI, op. cit.

support this statement: although rents for office space outside the CBD's of Denver and Houston are nearly identical, at $12.50 and $12.00 per square foot, rents for office space in the dense Denver CBD with good mass transit are $19.50, while they average only $13.97 per square foot in the Houston CBD.[1] Office rents outside the CBD thus average 85.9 percent of CBD rents in Houston compared to 64.1 percent in Denver; additional comparisons are available for Los Angeles, where office rents outside the CBD average 85.8 percent of CBD rents, Chicago, where they average 71.1 percent, and New York, where they average 48.5 percent.

TRANSPORTATION AND GROWTH

The economic implications of the downtown agglomeration, and the role of transportation in determining land values, are both objects of frequent economic analysis. Because of the nature of the agglomeration, it has long been noted that its productivity tends to increase with size.[2] Because the benefits of the agglomeration increase with size, the rate of growth it enjoys increases as the agglomeration grows. This means that the size of an agglomeration should be described by a second order equation of the form:

$$\text{Size} = a_0 + a_1 t + a_2 t^2 \qquad (2)$$

where t represents the number of years since some arbitrary starting point, a_0 represents the size of the agglomeration at that starting point, a_1 represents the

[1] Rent figures obtained from The Office Network, Inc., The National Office Market Report, Spring-Summer, 1981.

[2] See Bibliography: Meier; Alonso.

attraction of the agglomeration due to size and a_2 represents changes in attraction caused by changes in size. Thus, an ideal CBD - one in which each additional unit of office space increases the level of benefit enjoyed by all firms located in the agglomeration - is characterized by positive signs for a_0, a_1 and a_2.

Looking at the propositions that the modern CBD is a machine for the generation and trading of information, goods and services and that a large CBD is capable of supporting the type of environment which attracts quality employees, the role of transportation is clear. Just as the agglomeration acts to minimize the costs of friction for economic activities, congestion acts to increase them.

Traffic congestion may be seen as a major constraint in limiting the growth of agglomerations. If each additional unit of building space increases the level of congestion in a CBD, then the net benefit resulting from the increase in the agglomeration's size is reduced by the impact of the diseconomy of congestion. If the level of congestion in a CBD rises to the point where each additional unit of building space decreases the level of benefits enjoyed by existing businesses, then the agglomeration has reached the point of negative returns to scale. As the diseconomy of congestion takes its toll, the sign of a_2 may be expected to switch from positive to negative. Once diseconomies of scale have been encountered,

each additional firm increases the congestion to itself and to all of the members of the agglomeration. The long-run effect of negative returns to scale will be a reduction of total size until equilibrium is reached and a stable size is reached.

Figures 1-5 and 1-6 summarize trade-offs between agglomeration and congestion in determining the value of central locations. In Figure 1-5, line MB represents the marginal benefit of additions to the agglomeration (in other words, the benefit added by each increment). Each additional unit increases the benefit enjoyed by every unit, and thus adds a little more than the previous unit did. Line MC represents the marginal costs, in terms of congestion, of additions to the agglomeration. Between point O and point C, the increases are small because street capacities have not been filled. After point C, when congestion begins to slow peak hour traffic, each addition to the agglomeration increases the cost both to itself and to every other unit, so its impact is a little greater than that of the previous unit. Line NB represents the net marginal impact of each addition to the agglomeration, and is equal to MB-MC. NB approximately equals MC between point O and point C. After point C, the net benefit of each additional unit is smaller than the net benefit of the previous unit. After point D, where MC crosses MB, net benefit becomes negative; in other words, further additions to the agglomeration detract from the benefit enjoyed by firms located within it.

FIGURE 1-5

Marginal Costs and Benefits Resulting From Agglomeration

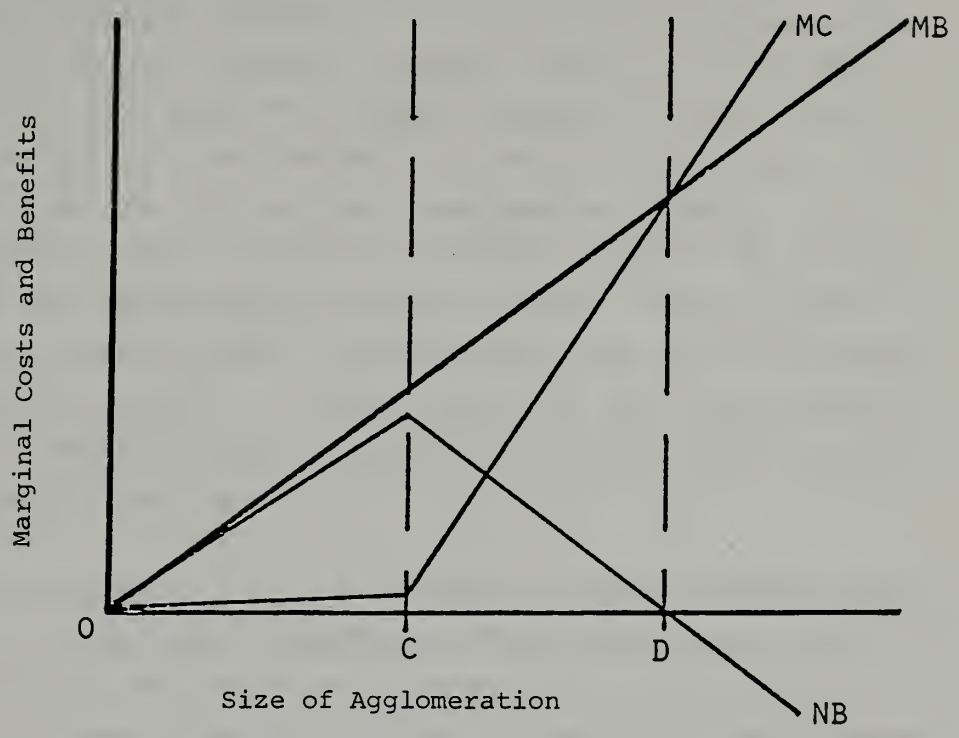


FIGURE 1-6

Total Costs and Benefits Resulting From Agglomeration

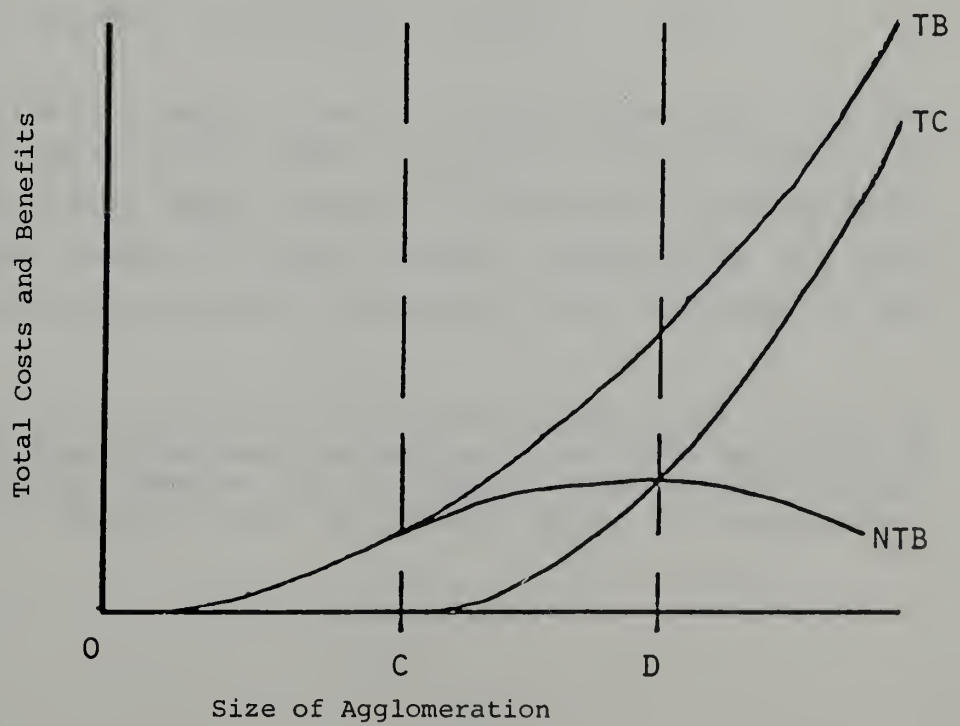


Figure 1-6 translates these marginal benefits and costs into the total benefits and costs of agglomeration. Line TB is the aggregate benefit to the entire agglomeration resulting from the marginal impacts shown by line MB (in Figure 1-5), and line TC is the aggregate cost resulting from the marginal costs shown by line MC (in Figure 1-5). Line NTB represents the net aggregate benefit of the agglomeration, and is equal to TB-TC. While TC is near zero, NTB is approximately equal to TB. After point C, congestion costs become significant and NTB increases less rapidly than TB. After point D, the net marginal benefit is negative and therefore the net total benefit (NTB) actually decreases.

A careful analysis of the growth of the office space existing in the San Francisco CBD during the past 23 years yields both empirical support for the validity of equation (2) and a measure of San Francisco's performance as an "ideal" office location. A second order regression of San Francisco's office growth since 1959 yields the following equation:*

$$\text{Size} = 14{,}056.9 + 534.49t + 32.95t^2 \qquad (3)$$

Size is given in square feet of office space and t is the number of years since 1959. Equation (3) is statistically significant well beyond the .01 level, and predicts the actual amount of office space existing at any time with an accuracy of over 99 percent. The accuracy of the

*Equation (3) is based on the net absorption of office space in San Francisco as derived from data provided by the Building Owners and Managers Association (BOMA), personal communication to Gruen Gruen + Associates, 1981.

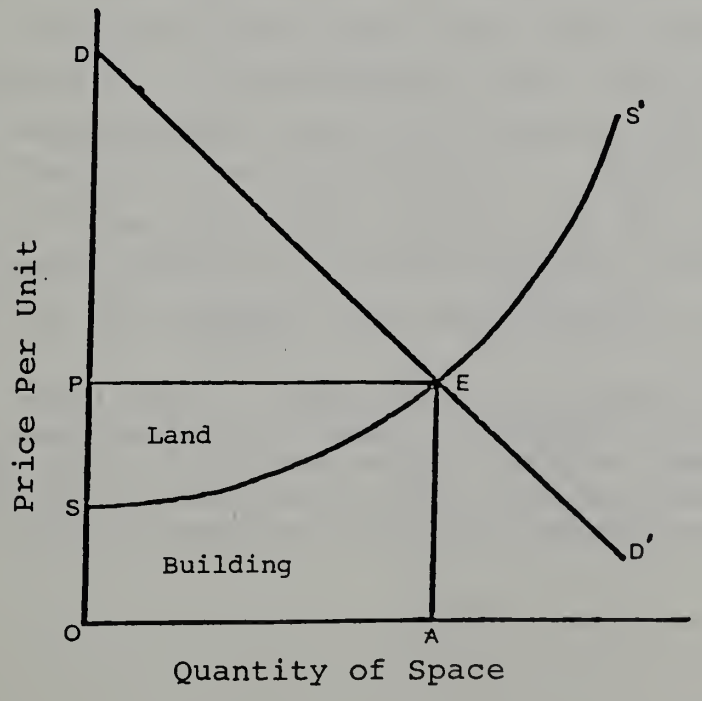
equation in predicting office space growth in San Francisco shows that the San Francisco experience is consistent with the model presented in equation (2) and explained in the preceding paragraphs.

THE ECONOMIC IMPACT OF A REDUCTION IN MUNI SERVICE TO THE ASSESSMENT DISTRICT

Having examined the basic nature of the central city agglomeration and the role of transportation in creating land value, we now undertake the task of determining the effect of a reduction in MUNI service to downtown San Francisco. Figure 1-7 represents the market determinants of downtown space supply and land values. It is consistent with the method of determining land value presented on page 21 and with the economic concepts of supply and demand. In Figure 1-7, DD' is the demand for building

FIGURE 1-7

Supply and Demand Curves For CBD Floor Space



space and SS' is the supply of building space. Their point of intersection, E, is the equilibrium point in the market. A line drawn from E perpendicular to the horizontal (space) axis intersects the axis at point A, and OA describes the total amount of space that will be supplied and demanded in the market. A line drawn from E perpendicular to the vertical (price) axis will intersect at point P, and OP is the market price per unit of space. The rectangle OPEA is the total value of all space provided. Area OSEA, which is labeled "building", is the portion of total value attributable to the buildings present, and is determined by the total cost - including profit, maintenance, and return on investment - of supplying amount OA of space. Area SEP is the residual of total value not attributable to the costs of supplying the space, and is therefore the value of the land.

Since site rentals and transport costs equal a constant, a sudden increase in the transport costs associated with a downtown location will result, in the short-run, in a decrease in the rents tenants are willing to pay in order to locate downtown.* Since a reduction in MUNI service would increase the cost of moving employees to and from work, employers will have less money available to spend on rents; or, alternatively, since the advantages offered by a downtown San Francisco location over a different Bay Area location are diminished by a reduction in MUNI service, firms would be willing to pay less for a San Francisco location. In either case, the end result is a drop in the demand for San Francisco building space.

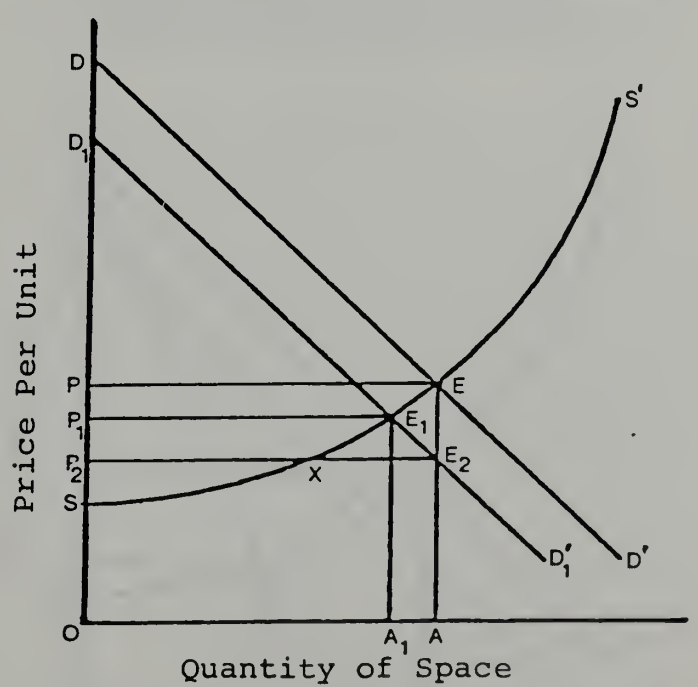
*The short-run is defined as that amount of time required for the market to react to changes in conditions. In this case, it is the amount of time required for salaries to increase to cover increased commuting costs and for rental contracts to expire and be renegotiated.

Since many rental contracts are currently being negotiated for relatively short periods of time, this short-run effect will make itself evident within a few years.

Figure 1-8 represents the short-run effects of a MUNI service cutback. The demand curve has dropped from DD' to D_1D_1'. The new equilibrium point, E_1, indicates that price should drop to P_1 and the amount of space absorbed by the market should fall to OA_1. Because an amount of space OA is already existing, however, and since it is unlikely that any buildings would be torn down in the short-run, the amount of space offered will exceed the demand for space at price P_1. If the owners of excess

FIGURE 1-8

Short Run Effects of a Permanant Muni Service Reduction

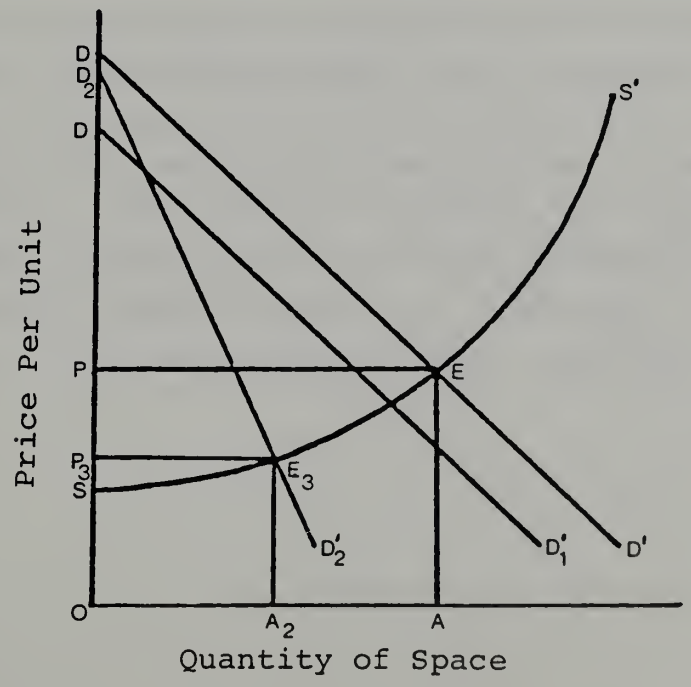


space closed their buildings down, they would lose returns equal to the area of A_1AEE_1. By keeping their buildings open, they are able to recoup the majority of their sunk costs. Keeping this excess space available, however, will depress total market prices even further, to P_2, and land values will fall to the level described by the area P_2XS. If the excess space is somehow held off the market, prices would only drop to P_1 and land value drop to P_1E_1S. However, the most likely result would be for the excess space to remain on the market in the short-run, for building owners to suffer a loss of XEE_2, and for land values to drop to P_2XS.

Figure 1-9 demonstrates the likely long-run effects of a reduction in MUNI service. Under the restraint of a

FIGURE 1-9

Long Run Effects of a Permanant Muni Service Reduction



lower demand curve, older buildings for which operating revenues do not cover maintenance costs will be removed from the market. In addition, much less new space will be added to replace decaying older space so that, in the long-run, the amount of space supplied can drop to the new equilibrium point. On the demand side, as some firms move out of the city and as remaining firms act to minimize the impact of increased transport costs, a new demand curve, D_2D_2', will emerge. The new demand line (D_2D_2') is steeper than the old demand line (DD) because firms that are not tied to downtown San Francisco will move out and firms that are tied to San Francisco will move functions which do not have to be in the city; therefore, the demand for space is smaller at all price levels. Those firms which must be located in San Francisco will adjust so as to minimize the impact of higher transport costs, thus driving the maximum price anyone is willing to pay for space up from D_1 to D_2, but not as high as the original level of D. The total amount of space absorbed by the market will fall to A_2, with land values dropping to P_3E_3S.

The figures and analysis presented do not imply that a reduction in MUNI service will hurt all areas of the Bay Region. It is very likely that certain areas within the region could substantially benefit from a reduction in MUNI service. Most likely to benefit are areas such as Walnut Creek, which show good growth potential but which are currently characterized by relatively low office rents due to the remoteness of their location. Although

a MUNI cut would not increase the accessibility of Walnut Creek, it would make Walnut Creek relatively more accessible by making San Francisco less accessible.

Houston, which is a growing city only slightly larger than San Francisco and growing slightly faster, is a prime example of the impact of a lack of adequate transportation facilities. Although the Houston region is growing very rapidly, only a small portion of that growth is centered in the CBD. Congestion has dictated that Houston grows as a "spread city", characterized by moderate land values and moderate rent rates throughout the region, with no sharp concentration of land values in the CBD. Instead, several nodes characterized by moderately high land values have developed around the region. The impact of Houston's "spread city" design on land values is quite apparent. Although the office agglomeration in Houston is larger than the one existing in San Francisco, and although Houston's office industry is growing faster than San Francisco's, rents in San Francisco average over twice as much as rents in Houston.*

That San Francisco has developed as the prime agglomeration in the Bay Area reaffirms the importance of transportation in creating the necessary conditions for growth. Although geographic conditions dictate that the Bay Area's regional center should be in Oakland, all transportation facilities - both roadways and mass

*The Office Network, Inc., op. cit.

transit lines, both inside and out of the City - emerge as radial feeders from a San Francisco hub. From the opening of the Twin Peaks streetcar tunnel in 1918, both land developers and the city government have realized the overwhelming importance of high quality transit service within San Francisco if San Francisco is not to be overshadowed by other areas in the Bay region.*

APPLYING THE THEORY

The remainder of this report applies the theories presented in the preceding portions of this chapter to define the area that receives a special benefit from MUNI and to estimate the minimum amount of the special benefit conferred on that area by MUNI. The special benefit is defined as the benefit of the extra (special) level of MUNI service provided to downtown. This benefit is measured by quantifying the changes in obtainable rents that would result if that special level of service were removed.

Chapter 2 defines the downtown area that receives a special level of MUNI service. Chapter 3 then presents an estimate of the amount of special service received by that area and the increase in commuters' transportation costs that would result if downtown received only the citywide average level of service instead of the special level identified. Only the increase in out-of-pocket expenditures associated with shifts to commuting by other

*U. S. Department of Transportation, Land Use Impacts of Rapid Transit, Final Report, August 1977, page 26.

available means is estimated.* This increase is the minimum benefit derived from the special level of MUNI service, and represents only a small portion of the total benefit realized from the agglomeration of downtown uses allowed by MUNI's service to the area.

Chapter 4 carries the analysis further by evaluating the increase in downtown workers' commute costs if the employees' places of residence shifted to take advantage of available capacity on other Bay Area public transit systems. It also includes an examination of the regional systems' abilities to accommodate expected downtown employment growth without maintenance or expansion of MUNI service. It should be noted that the estimates developed in Chapter 4 do not represent our estimates of the minimum benefit, as described above, but are provided to illustrate an alternative hypothetical response to MUNI service reduction.

Chapter 5 summarizes the findings of Chapters 1 through 4 and offers conclusions regarding the total impacts of a reduction of MUNI service to downtown San Francisco.

Chapter 6 discusses the approach that appears most appropriate to implement a special assessment on downtown property owners to recapture some of the special benefit they derive from MUNI service.

*Additional costs - e.g., the time and inconvenience of alternate commute modes - are not readily quantifiable and therefore are not addressed.

CHAPTER 2

DEFINITION OF THE SPECIAL BENEFIT AREA

An area of San Francisco that receives special benefit from MUNI service must have two critical characteristics: (1) it must receive a special level of MUNI service and (2) it must have a zoning designation that allows uses which benefit from agglomeration. A special level of service is defined as a level of daily service (weekday, 24-hour) significantly greater than the citywide average level. Uses that benefit from agglomeration are uses that benefit from easy exchange of information or from the ability to collect employees or clients into a concentrated area. The concurrence of these two characteristics in an area that may be said to derive special benefit from MUNI is discussed below.

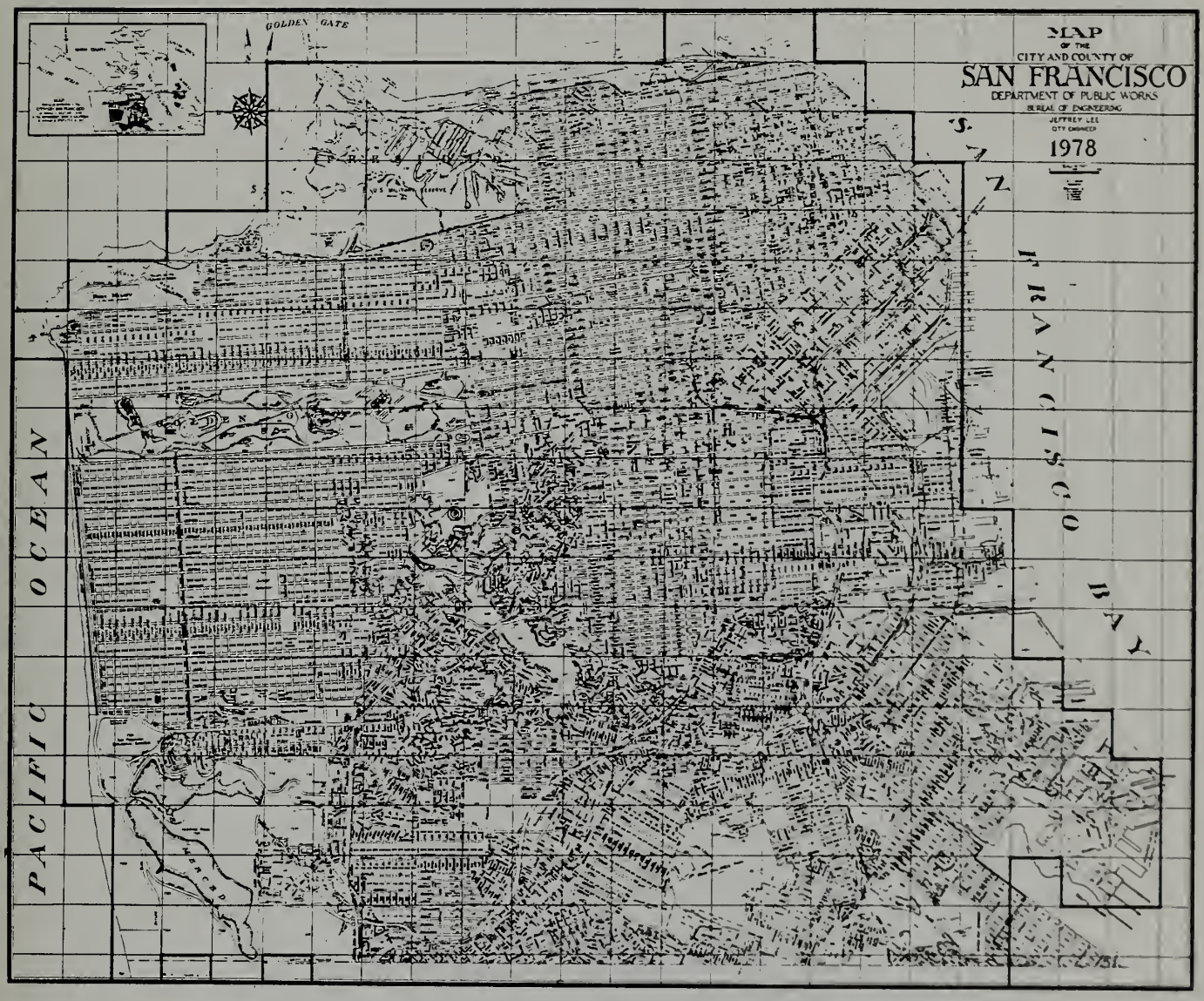
AREA RECEIVING A SPECIAL LEVEL OF MUNI SERVICE

The following steps were completed to define the area of San Francisco that receives a level of MUNI service significantly greater than the citywide average:

1. MUNI routes were drawn onto a map of San Francisco that had been divided into 367 2,000 - by - 2,000-foot squares. Grid squares with no streets were eliminated, leaving 344 squares. A map with the grid squares is shown in Figure 2-1.

FIGURE 2-1

Map of San Francisco with Grid Squares



Source: Gruen Gruen + Associates. Base map from City and County of San Francisco.

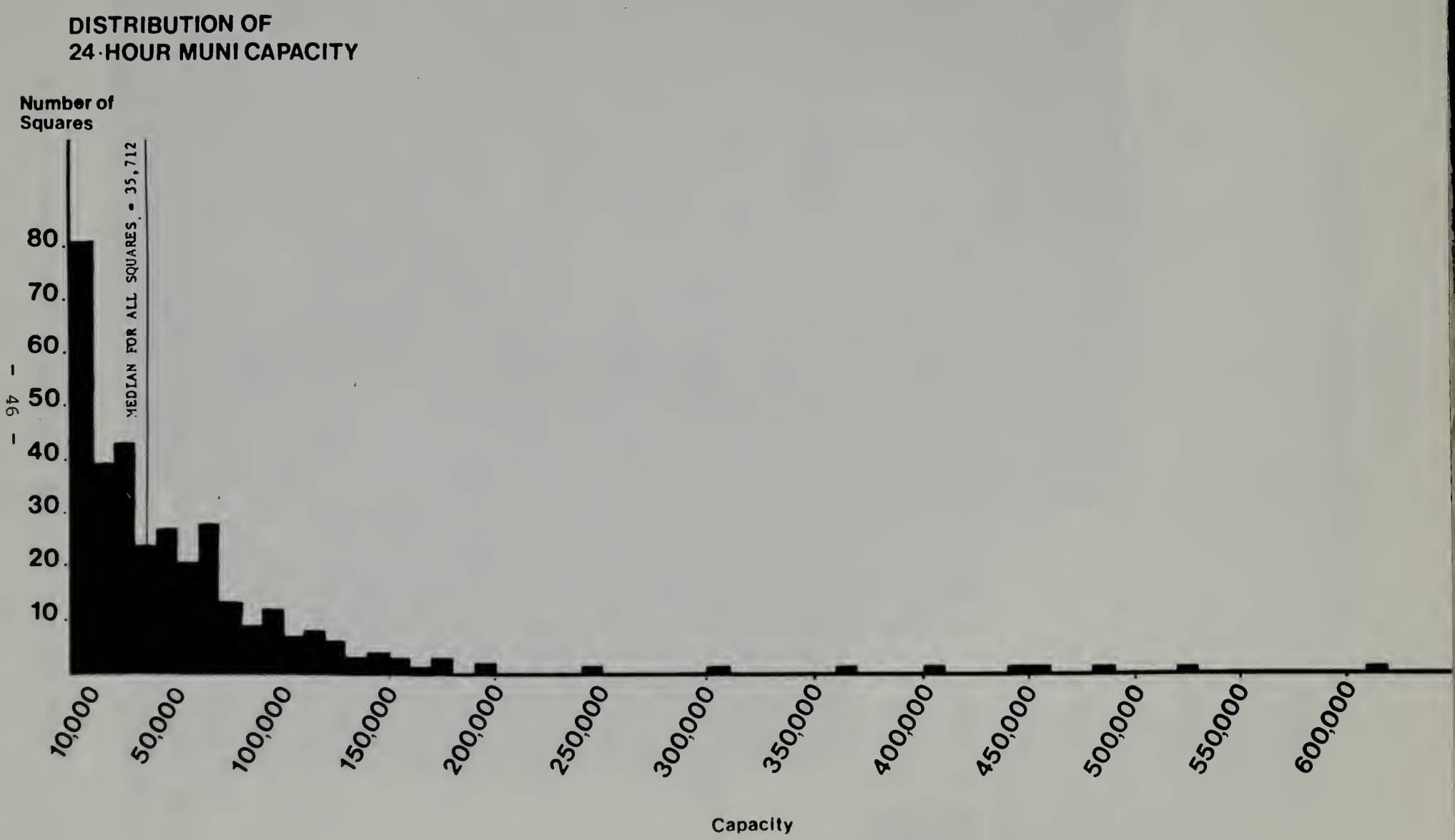
2. The number of MUNI vehicles on each route scheduled to pass through each grid square each weekday (24-hours) was counted. Both inbound and outbound runs were tallied.

3. The total number of vehicles of each type (motor coach, cable car, etc.) counted for each square was multiplied by the capacity for that type of vehicle, as indicated by MUNI. Capacities were summed to indicate the total MUNI capacity per grid square. The tallying procedure indicated a range in MUNI capacity from 0 units to 610,325 units (a "unit" of capacity is the ability to carry one person). The distribution of capacities among the 344 grid squares is illustrated in Figure 2-2. This distribution is mapped in Figure 2-3 for the downtown area.

4. The largest contiguous area with a very high (top 10 percent of grid squares) capacity was examined in closer detail. Street

FIGURE 2-2

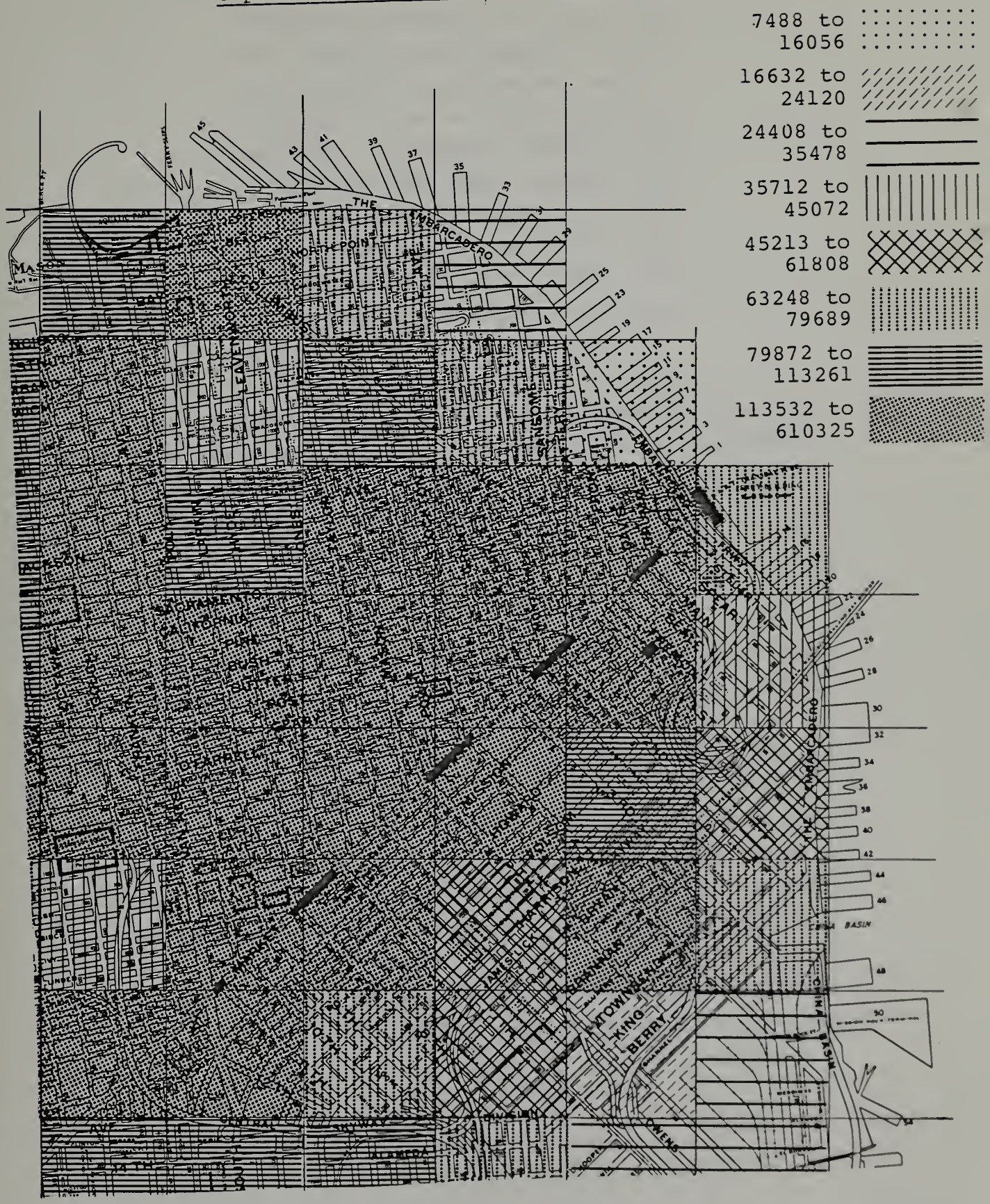
Distribution of MUNI Capacity Among Grid Squares



Source: Gruen Gruen + Associates

FIGURE 2-3

Capacities of Downtown Grid Squares



Source: Gruen Gruen + Associates, based on data from MUNI.

segments served by at least two bus lines were mapped, and the area within one-quarter mile - judged to be a conservatively defined reasonable walking distance and the MUNI standard for service - was outlined. The area thus identified to be within one-quarter mile of major MUNI service routes is shown in Figure 2-4.

The area outlined in Figure 2-4 is the area of downtown that receives a special level of MUNI service, because it receives a high level of service consistently over a large geographic area.

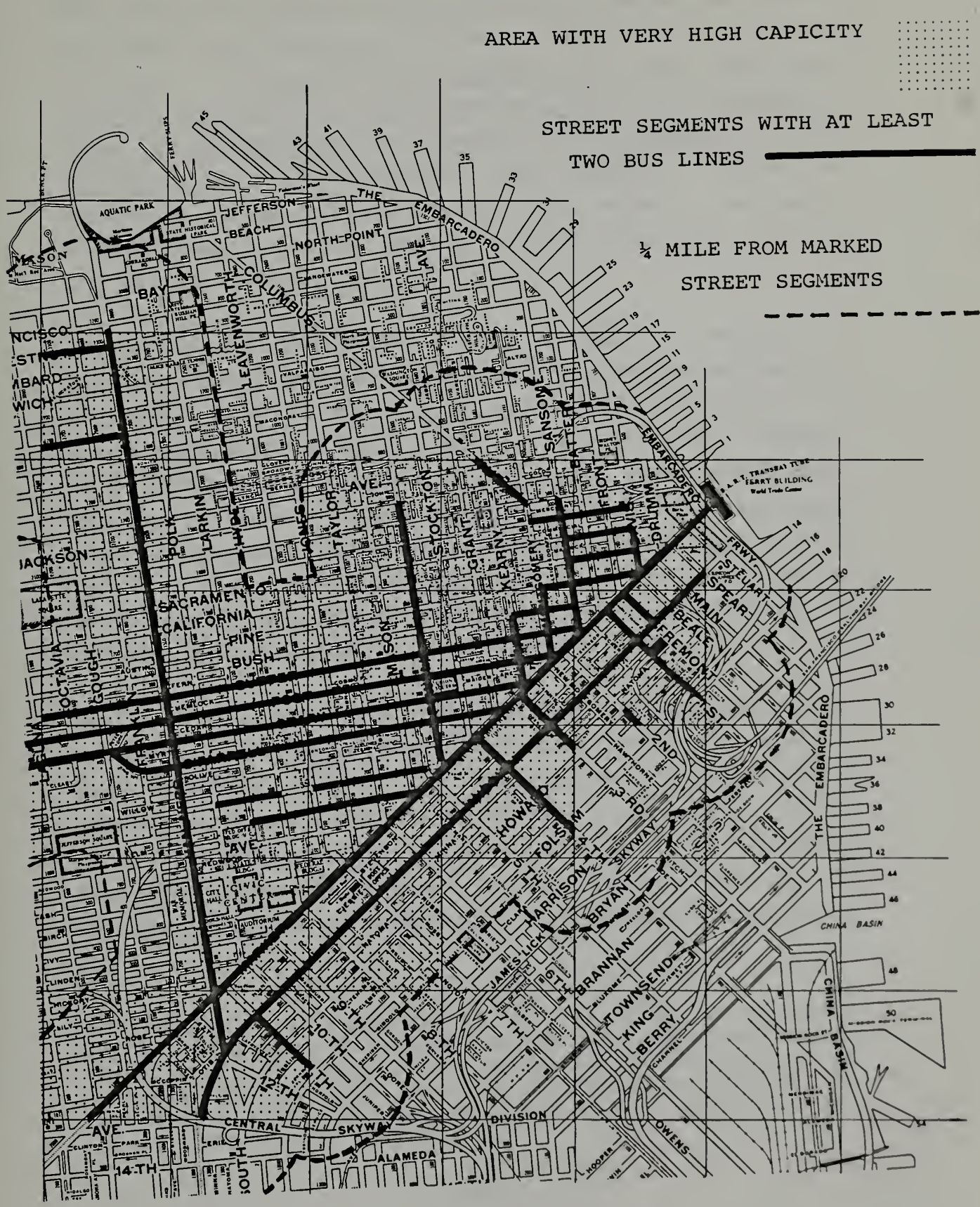
AREA ZONED TO BENEFIT
FROM AGGLOMERATION

In general, uses that gain an advantage from central city agglomeration are those for which easy accessibility, face-to-face communication and transfer of information are important. These types of uses include most office activities, retail activities geared to citywide or regional clientele, and service (including hotel and restaurant) and industrial activities that are linked to commercial uses in a nearby area. As explained on page 20, residential uses do not benefit from agglomeration.

The presence of agglomeration acts to increase the demand for the types of uses named above, because it decreases

FIGURE 2-4

Area Within One-quarter Mile of Major MUNI Routes



Source: Gruen Gruen + Associates

the costs of production and increases the market opportunities for businesses located in the area of concentration. To benefit from agglomeration, the land owner must be allowed to develop property into the types of uses for which demand is enhanced by the presence of the agglomeration. Furthermore, that benefit - which is expressed as an enhancement of land value - increases with increases in the density at which the uses may be and are developed.

The types and densities of uses allowed to develop in different San Francisco locations are governed by the San Francisco City Planning Code. The Code describes the characteristics of commercial and manufacturing (industrial) zones, and itemizes the specific uses, along with any restrictions on those uses, permitted in areas zoned for residential, commercial, manufacturing and public use. It also identifies the density of use permitted in each zone by regulating the floor area ratio (FAR)* of buildings constructed in the different zones.

Table 2-1 presents the descriptions of commercial and manufacturing zoning districts from the San Francisco City Planning Code. The descriptions indicate that commercial zones are designed to fill a variety of needs, from neighborhood convenience shopping (C-1) to "intense" downtown office development "playing a leading role in finance, corporate headquarters and service industries,

*The floor area ratio (FAR) is the area of enclosed building space, as defined in the code, divided by the land area of the site on which it is located. For example, a two-story building covering its entire lot and a four-story building covering 50 percent of its lot would both have an FAR of 2.0.

TABLE 2-1

Characteristics of Zoning Districts

C-1 Districts: Neighborhood Shopping

These districts are intended for the supplying of retail goods and personal services at convenient locations to meet the frequent and recurring needs of nearby residents. These districts are usually surrounded by residential areas of relatively low density of development, often in outlying areas of the city, and the size and use of commercial buildings in these districts are intended to be consistent with those residential densities. Close concentrations of complementary commercial uses are encouraged, with minimum interruption by open uses and non-retail enterprises.

C-2 Districts: Community Business

These districts serve several functions. On a larger scale than the C-1 districts, they provide convenience goods and services to residential areas of the city, both in outlying sections and in closer-in, more densely built communities. In addition, some C-2 districts provide comparison shopping goods and services on a general or specialized basis to a city-wide or a regional market area, complementing the main area for such types of trade in downtown San Francisco. The extent of these districts varies from smaller clusters of stores to larger concentrated areas, including both shopping centers and strip developments along major thoroughfares, and in each case the character and intensity of commercial development are intended to be consistent with the character of other uses in the adjacent areas. As in C-1

districts, the emphasis is upon compatible retail uses, but a wider variety of goods and services is included to suit the longer term needs of customers and a greater latitude is given for the provision of automobile-oriented uses.

C-3 Districts: Downtown Commercial

Downtown San Francisco, a center for city, regional, national and international commerce, is composed of four separate districts, as follows:

C-3-O District: Downtown Office

This district, playing a leading national role in finance, corporate headquarters and service industries, and serving as an employment center for the region, consists primarily of high quality office development. The intensity of building development is the greatest in the city, resulting in a notable skyline symbolizing the area's strength and vitality. The district is served by city and regional transit reaching its central portions and by automobile parking at peripheral locations. Intensity and compactness permit face-to-face business contacts to be made conveniently by travel on foot. Office development is supported by some related retail and service uses within the area, with unrelated uses excluded in order to conserve the supply of land in the core and its expansion areas for further development of major office buildings. Certain desirable building feataures are encouraged by means of development bonuses.

C-3-R District: Downtown Retail

This district is a regional center for comparison shopper retailing

and direct consumer services. It covers a compact area with a distinctive urban character, consists of uses with cumulative customer attraction and compatibility, and is easily traversed by foot. Like the adjacent Downtown Office district, this district is well served by city and regional transit, with automobile parking best located at its periphery. Within the district, continuity of retail and consumer service uses is emphasized, with encouragement of pedestrian interest and amenities and minimization of conflicts between shoppers and motor vehicles. A further merging of this district with adjacent, related districts is anticipated, partially through development of buildings which combine retailing with other functions.

C-3-G District: Downtown General Commercial

This district covers the northern and western portions of downtown and is composed of a variety of uses: retail, offices, hotels, entertainment, clubs and institutions, and high-density residential. Many of these uses have a city-wide or regional function, although the intensity of development is lower here than in the downtown core area. As in the case of other downtown districts, no off-street parking is required for individual commercial buildings, but in portions of this district automobile parking is a major land use, serving this district and the adjacent office and retail core areas. In the vicinity of Market Street, the configuration of this district reflects easy accessibility by rapid transit.

C-3-S District: Downtown Support

This district exists primarily to accommodate near the intensive downtown core areas important supporting functions such as wholesaling, printing, building services and parking. Motor vehicle access from freeway ramps to this district is good, and truck and automobile traffic is heavy; at the same time, the district is within walking distance of rapid transit on Market Street. In its eastern portion, the district also serves in part as an expansion area for offices, at a lesser intensity than in the Downtown Office district. The district has for the most part been underdeveloped in the past, and opportunities exist for major developments of new uses covering substantial areas.

C-M Districts: Heavy Commercial

These districts provide a limited supply of land for certain heavy commercial uses not permitted in other commercial districts. There is an emphasis upon wholesaling and business services, and some light manufacturing and processing are also permitted though limited in most cases to less than an entire building. In recognition of the potentially adverse effects of these heavy uses and the proximity of these districts to residential and other commercial areas, standards are imposed as to enclosure within buildings and screening of outdoor uses.

M-1 Districts: Light Industrial

These are one of two types of districts providing land for industrial development. In general, the M-1 districts are more suitable for smaller industries

dependent upon truck transportation, while the M-2 districts are more suitable for larger industries served by rail and water transportation and by large utility lines. In M-1 districts, most industries are permitted, but some with particularly noxious characteristics are excluded. The permitted industries have certain requirements as to enclosure, screening and minimum distance from Residential districts.

M-2 Districts: Heavy Industrial

These districts are the least restricted as to use and are located at the eastern edge of the city, separated from residential and commercial areas. The heavier industries are permitted, with fewer requirements as to screening and enclosure than in M-1 districts, but many of these uses are permitted only as conditional uses or at a considerable distance from Residential districts.

Source: San Francisco City Planning Code, Sections 210.1 - 210.6.

and serving as an employment center for the region" (C-3-O) and "a regional center for comparison shopping" (C-3-R).

Table 2-2 summarizes the specific uses permitted in each zone, and Table 2-3 (page 67) summarizes the density of development, expressed in terms of the allowable floor area ratio, in each zone.

Based on the descriptions reproduced in Table 2-1, the development density permitted in each, as summarized in Table 2-2, and the specific uses permitted in each zone, summarized in Table 2-3, the following zoning districts allow the types of uses able to benefit from the agglomeration permitted by a high level of transit service: RC-2, RC-3, R-C-4, C-2, C-3-O, C-3-R, C-3-G, C-3-S, M-1 and M-2.[1] The residential zones are included in this list because they allow the development of business and professional offices. The commercial districts are included because they permit all types of uses that benefit from agglomeration. It may be noted that the C-2 zone, which is the least intensive of the included commercial zones, is described in part by the code as follows:

> On a larger scale than the C-1 districts, they[2] provide convenience goods and services to residential areas of the city, both in outlying and closer-in, more densely built communities. In addition, some C-2

[1]This list identifies zoning districts that allow uses which benefit from agglomeration. That the zoning district permits such uses does not mean that those uses have necessarily been developed on a particular site. Further, the inclusion of a district on this list does not necessarily mean it is actually included in the special benefit area as defined beginning on page 68 of this report.

[2]The C-2 districts.

TABLE 2-2: Uses Permitted in Zoning Districts

	RH-1(D)	RH-1	RH-1(S)	RH-2	RH-3	RM-1	RM-2	RM-3	RM-4	RC-1	RC-2	RC-3	RC-4
Sec. 209.1. Dwellings.													
(a) One-family dwelling having side yards as required by Section 133 of this Code.	P	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(b) Other one-family dwelling.		P	P	P	P	P	P	P	P	P	P	P	P
(c) Two-family dwelling with the second dwelling unit limited to 600 square feet of net floor area.			P	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(d) Other two-family dwelling.				P	P	P	P	P	P	P	P	P	P
(e) Three-family dwelling.					P	P	P	P	P	P	P	P	P
(f) Dwelling at a density ratio up to one dwelling unit for each 3,000 square feet of lot area, but no more than three dwelling units per lot, if authorized as a conditional use by the City Planning Commission.		C	C	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(g) Dwelling at a density ratio up to one dwelling unit for each 1,500 square feet of lot area, if authorized as a conditional use by the City Planning Commission.				C	NA	NA	NA	NA	NA	NA	NA	NA	
(h) Dwelling at a density ratio up to one dwelling unit for each 1,000 square feet of lot area, if authorized as a conditional use by the City Planning Commission.					C	NA	NA	NA	NA	NA	NA	NA	NA
(i) Dwelling at a density ratio not exceeding one dwelling unit for each 800 square feet of lot area.						P	NA	NA	NA	P	NA	NA	NA
(j) Dwelling at a density ratio not exceeding one dwelling unit for each 600 square feet of lot area.							P	NA	NA		P	NA	NA
(k) Dwelling at a density ratio not exceeding one dwelling unit for each 400 square feet of lot area.								P	NA			P	NA
(l) Dwelling at a density ratio not exceeding one dwelling unit for each 200 square feet of lot area; provided, that for purposes of this calculation a dwelling unit in these districts containing no more than 500 square feet of net floor area and consisting of not more than one habitable room in addition to a kitchen and a bathroom may be counted as equal to three-fourths of a dwelling unit.									P				P
(m) Dwelling specifically designed for and occupied by senior citizens or physically handicapped persons, at a density ratio or number of dwelling units not exceeding twice the number of dwelling units otherwise permitted above as a principal use in the district. Such dwellings shall be limited to such occupancy for the actual lifetime of the building by the requirements of State or Federal programs for housing for senior citizens or physically handicapped persons, or otherwise by design features and by legal arrangements approved as to form by the City Attorney and satisfactory to the Department of City Planning.	P	P	P	P	P	P	P	P	P	P	P	P	P
Sec. 209.2. Other Housing.													
(a) Group housing, boarding: providing lodging or both meals and lodging, without individual cooking facilities, by prearrangement for a week or more at a time and housing six or more persons in a space not defined by this Code as a dwelling unit. Such group housing shall include but not necessarily be limited to a boarding house, guest house, rooming house, lodging house, residence club, commune, fraternity and sorority house but shall not include group housing for religious orders or group housing for medical and educational institutions, whether on a separate lot or part of an institution, as defined and regulated by this Code. The density limitations for group housing, by district, shall be as set forth in Section 208 of this Code.				C	C	P	P	P	P	P	P	P	P
(b) Group housing, religious orders: providing lodging or both meals and lodging, without individual cooking facilities, by prearrangement for a week or more at a time and housing six or more persons in a space not defined by this Code as a dwelling unit, where such housing is for members of a religious order				C	C	P	P	P	P	P	P	P	P

Table 2-2, continued

	RH-1(D)	RH-1	RH-1(S)	RH-2	RH-3	RM-1	RM-2	RM-3	RM-4	RC-1	RC-2	RC-3	RC-4
calling for collective work or worship and is not defined as, or on the same lot as, a religious institution as defined and regulated by Section 209.3(j) of this Code. Such housing shall include but not necessarily be limited to a monastery, nunnery, convent and ashram. The density limitations for group housing, by district, shall be as set forth in Section 208 of this Code.				C	C	C	C	C	C	C	C	C	C
(c) Group housing, medical and educational institutions: providing lodging or both meals and lodging, without individual cooking facilities, by prearrangement for a week or more at a time and housing six or more persons in a space not defined by this Code as a dwelling unit, where such facility is affiliated with and operated by a medical or educational institution as defined and regulated by Sections 209.3(a), (g), (h) and (i) of this Code but not located on the same lot as such institution and not used for in-patient care. Such housing shall meet the applicable provisions of Section 304.5 of this Code concerning institutional master plans. The density limitations for group housing, by district, shall be as set forth in Section 208 of this Code.				C	C	C	C	C	C	P	P	P	P
(d) Hotel, inn or hostel containing no more than five rooms or suites of rooms, none with individual cooking facilities, which are offered for compensation and are primarily for the accommodation of transient overnight guests. A hotel, inn or hostel shall not include a motel as defined and regulated by Section 216(c) of this Code.										C	C	C	C
(e) Hotel, inn or hostel as specified in Subsection 209.2(d) above but with six or more guest rooms or suites.													

Sec. 209.3. Institutions.	RH-1(D)	RH-1	RH-1(S)	RH-2	RH-3	RM-1	RM-2	RM-3	RM-4	RC-1	RC-2	RC-3	RC-4
(a) Hospital, medical center or other medical institution which includes facilities for in-patient care and may also include medical offices, clinics, laboratories, and employee or student dormitories and other housing, operated by and affiliated with the institution, which institution has met the applicable provisions of Section 304.5 of this Code concerning institutional master plans.	C	C	C	C	C	C	C	C	C	C	C	C	C
(b) Residential care facility providing lodging, board and care for a period of 24 hours or more to six or fewer persons in need of specialized aid by personnel licensed by the State of California. Such facility shall display nothing on or near the facility which gives an outward indication of the nature of the occupancy except for a sign as permitted by Article 6 of this Code, shall not provide out-patient services and shall be located in a structure which remains residential in character. Such facilities shall include but not necessarily be limited to a board and care home, family care home, long-term nursery, orphanage, rest home or home for the treatment of addictive, contagious or other diseases or phychological disorders.	P	P	P	P	P	P	P	P	P	P	P	P	P
(c) Residential care facility meeting all applicable requirements of Subsection 209.3(b) above but providing lodging, board and care as specified therein to seven or more persons.	C	C	C	C	C	C	C	C	C	C	C	C	C
(d) Philanthropic facility providing assistance of a charitable or public service nature and not of a profit-making or commercial nature. (With respect to RC districts, see also Section 209.9(d).)										C	C	C	C
(e) Child care facility providing less than 24-hour care for 12 or fewer children by licensed personnel and meeting the open-space	P	P	P	P	P	P	P	P	P	P	P	P	P

	RH-1(D)	RH-1	RH-1(S)	RH-2	RH-3	RM-1	RM-2	RM-3	RM-4	RC-1	RC-2	RC-3	RC-4
and other requirements of the State of California and other authorities.													
(f) Child care facility providing less than 24-hour care for 13 or more children by licensed personnel and meeting the open-space and other requirements of the State of California and other authorities. (With respect to RC districts, see also Section 209.9(d).)	C	C	C	C	C	C	C	C	C	C	C	C	C
(g) Elementary school, either public or private. Such institution may include employee or student dormitories and other housing operated by and affiliated with the institution. (With respect to RC districts, see also Section 209.9(d).)	C	C	C	C	C	C	C	C	C	C	C	C	C
(h) Secondary school, either public or private, other than a school having industrial arts as its primary course of study. Such institution may include employee or student dormitories and other housing operated by and affiliated with the institution. (With respect to RC districts, see also Section 209.9(d).)	C	C	C	C	C	C	C	C	C	C	C	C	C
(i) Post-secondary educational institution for the purposes of academic, professional, business or fine-arts education, which institution has met the applicable provisions of Section 304.5 of this Code concerning institutional master plans. Such institution may include employee or student dormitories and other housing operated by and affiliated with the institution. Such institution shall not have industrial arts as its primary course of study.	C	C	C	C	C	C	C	C	C	C	C	C	C
(j) Church or other religious institution which has a tax-exempt status as a religious institution granted by the United States Government, and which institution is used primarily for collective worship or ritual or observance of common religious beliefs. Such institution may include, on the same lot, the housing of persons who engage in supportive activity for the institution. (With respect to RC districts, see also Section 209.9(d).)	C	C	C	C	C	C	C	C	C	C	C	C	C
Sec. 209.4. Community Facilities.													
(a) Community clubhouse, neighborhood center, community cultural center or other community facility not publicly owned but open for public use, in which the chief activity is not carried on as a gainful business and whose chief function is the gathering of persons from the immediate neighborhood in a structure for the purposes of recreation, culture, social interaction or education other than that regulated by Section 209.3 of this Code. (With respect to RC districts, see also Section 209.9(d).)	C	C	C	C	C	C	C	C	C	C	C	C	C
(b) Private lodge, private clubhouse, private recreational facility or community facility other than as specified in Subsection 209.4(a) above, and which is not operated as a gainful business. (With respect to RC districts, see also Section 209.9-(d).)										C	C	C	C
Sec. 209.5. Open Recreation and Horticulture.													
(a) Open recreation area not publicly owned which is not screened from public view, has no structures other than those necessary and incidental to the open land use, is not operated as a gainful business and is devoted to outdoor recreation such as golf, tennis or riding;	C	C	C	C	C	C	C	C	C	P	P	P	P
(b) Open space used for horticultural or passive recreational purposes which is not publicly owned and is not screened from public view, has no structures other than those necessary and incidental to the open land use, is not served by vehicles other than normal maintenance equipment, and has no retail or wholesale sales on the premises. Such open space may include but not necessarily be limited to a park, playground, plant nursery, rest area, community garden or neighborhood garden.	P	P	P	P	P	P	P	P	P	P	P	P	P

	RH-1(D)	RH-1	RH-1(S)	RH-2	RH-3	RM-1	RM-2	RM-3	RM-4	RC-1	RC-2	RC-3	RC-4
(c) Greenhouse, plant nursery, truck garden or other land or structure devoted to cultivation of plants of any kind, either with or without retail or wholesale sales on the premises. (With respect to RC districts, see also Section 209.9(d).)	C	C	C	C	C	C	C	C	C	C	C	C	C
Sec. 209.6. Public Facilities and Utilities.													
(a) Public structure or use of a non-industrial character, when in conformity with the Master Plan. Such structure or use shall not include a storage yard, incinerator, machine shop, garage or similar use.	P	P	P	P	P	P	P	P	P	P	P	P	P
(b) Utility installation, including but not necessarily limited to water, gas, electric, transportation or communications utilities, or public service facility, provided that operating requirements necessitate placement at this location.	C	C	C	C	C	C	C	C	C	C	C	C	C
Sec. 209.7. Vehicle Storage and Access.													
(a) Community garage, confined to the storage of private passenger automobiles of residents of the immediate vicinity, and meeting the requirements of Article 1.5 of this Code.	C	C	C	C	C	C	C	C	C	C	C	C	C
(b) Access driveway to property in C or M district, or to property in an R district in which the permitted dwelling unit density is greater than that permitted in the district where the driveway is located, provided that a solid fence, solid wall, or compact evergreen hedge, not less than six feet in height, is maintained along such driveway to screen it from any adjoining lot in any R district. Such driveway shall meet the applicable requirements of Article 1.5 of this Code	C	C	C	C	C	C	C	C	C	P	P	P	P
(c) Off-street parking facility to serve a use permitted in any R district, when such parking is not classified as accessory parking for such use, under the provisions of Section 204.5 of this Code, in terms of its location and amount. Such parking shall meet, where applicable, the requirements of Section 156 for parking lots, Section 159 for parking not on the same lot as the building or use served, and the other provisions of Article 1.5 of this Code. In considering any application for a conditional use for such parking where the amount of parking provided exceeds the amount classified as accessory parking in Section 204.5, the City Planning Commission shall consider the criteria set forth in Section 157 of this Code.	C	C	C	C	C	C	C	C	C	C	C	C	C
Sec. 209.8. Commercial Establishments.													
(a) Retail, personal service or other commercial establishment permitted as a principal use in a C-1 district, which is located within or below the ground story of a building; excluding any establishment designed primarily for customers arriving at that establishment by private motor vehicle.										P	NA	NA	NA
(b) Retail, personal service or other commercial establishment permitted as a principal use in a C-1 district, which is located in a building above the ground story; excluding any establishment designed primarily for customers arriving at that establishment by private motor vehicle.										C	NA	NA	NA
(c) Retail, personal service or other commercial establishment permitted as a principal use in a C-2 district, which is located within or below the ground story of a building; excluding any establishment designed primarily for customers arriving at that establishment by private motor vehicle.											P	P	P

	RH-1(D)	RH-1	RH-1(S)	RH-2	RH-3	RM-1	RM-2	RM-3	RM-4	RC-1	RC-2	RC-3	RC-4
(d) Retail, personal service or other commercial establishment permitted as a principal use in a C-2 district, which is located in a building above the ground story; excluding any establishment designed primarily for customers arriving at that establishment by private motor vehicle.											C	C	C
Sec. 209.9. Other Uses.													
(a) Sale or lease sign, as defined and regulated by Article 6 of this Code.	P	P	P	P	P	P	P	P	P	P	P	P	P
(b) Planned Unit Development, as defined and regulated by Section 304 and other applicable provisions of this Code.	C	C	C	C	C	C	C	C	C	C	C	C	C
(c) Temporary uses, as specified in and regulated by Sections 205 through 205.2 of this Code.	SEE SECTIONS 205 THROUGH 205.2												
(d) Any use as specified in, and regulated by, Sections 209.3(d),(f), (g),(h),(j); 209.4(a),(b); or 209.5(c) of this Code, when located in or below the ground story of a building and not above the ground story.										P	P	P	P
(e) Any use listed as a principal or conditional use permitted in a C-1 or C-2 district, when located in a structure on a landmark site designated pursuant to Article 10 of this Code.	C	C	C	C	C	C	C	C	C	C	C	C	C

	C-1	C-2	C-3-O	C-3-R	C-3-G	C-3-S	C-M	M-1	M-2
SEC. 215. DWELLINGS.									
(a) Dwelling at a density ratio not exceeding the number of dwelling units permitted in the nearest R district, with the distance to such R district measured from the mid-point of the front lot line or from a point directly across the street therefrom, whichever permits the greater density; provided, that the maximum density ratio in a C-1, C-2, M-1 or M-2 district shall in no case be less than for an RM-1 district, the maximum density ratio in a C-3 or C-M district shall in no case be less than for an RM-4 district, and the maximum density ratio in a C-3 district shall in no case be less than one dwelling unit for each 125 square feet of lot area. The rules for calculation of dwelling unit densities set forth in Section 207.1 of this Code shall apply in C and M districts, except that any remaining fraction of one-half or more of the minimum amount of lot area per dwelling unit shall be adjusted upward to the next higher whole number of dwelling units.	P	P	P	P	P	C	C	C	C
(b) Mobile home park for house trailers, motor homes, campers and similar vehicles or structures used for dwelling purposes. Each vehicle or structure in any such park shall be regulated by this Code in the same manner as a dwelling unit.							C	C	C
SEC. 216. OTHER HOUSING.									
(a) Group housing, providing lodging or both meals and lodging, without individual cooking facilities, by prearrangement for a week or more at a time, in a space not defined by this Code as a dwelling unit. Such group housing shall	P	P	P	P	P	C	C	C	C

	C-1	C-2	C-3-O	C-3-R	C-3-G	C-3-S	C-M	M-1	M-2
include but not necessarily be limited to a boarding house, guest house, rooming house, lodging house, residence club, commune, fraternity or sorority house, monastery, nunnery, convent or ashram. It shall also include group housing affiliated with and operated by a medical or educational institution, when not located on the same lot as such institution, which shall meet the applicable provisions of Section 304.5 of this Code concerning institutional master plans. The density limitations for all group housing described in this subsection shall be based upon the density limitations for group housing in the nearest R district, following the same rules as those set forth in Section 215(a) of this Code for dwelling unit densities in C and M districts.									
(b) Hotel, inn or hostel containing rooms or suites of rooms, none with individual cooking facilities, which are offered for compensation and are primarily for the accommodation of transient overnight guests. A hotel, inn or hostel shall not include a motel as described in Subsection 216(c) below.	P	P	P	P	P	P	P	C	C
(c) Motel, including an auto court, motor lodge, tourist court or other facility similarly identified, containing rooms or suites of rooms, none with individual cooking facilities, which are offered for compensation and are primarily for the accommodation of transient guests traveling by automobile, and where each sleeping unit is independently accessible from the outside; provided, that the entrance to such motel is within 200 feet of and immediately accessible from a major thoroughfare as designated in the Master Plan.	P	NA			NA	NA	NA	NA	NA
(d) Motel, as described in Subsection 216(c) above but without restriction as to location of its entrance.		P			P	P	P	C	C
SEC. 217. INSTITUTIONS.									
(a) Hospital, medical center or other medical institution which includes facilities for in-patient care and may also include medical offices, clinics, laboratories, and employee or student dormitories and other housing, operated by and affiliated with the institution, which institution has met the applicable provisions of Section 304.5 of this Code concerning institutional master plans.	C	C	C	C	C	C	C	C	
(b) Residential care facility providing lodging, board and care for a period of 24 hours or more to persons in need of specialized aid by personnel licensed by the State of California. Such facilities shall include but not necessarily be limited to a board and care home, family care home, long-term nursery, orphanage, rest home or home for the treatment of addictive, contagious or other diseases or psychological disorders.	P	P	P	P	P	C	P	P	
(c) Clinic primarily providing outpatient care in medical, psychiatric or other healing arts and not a part of a medical institution as specified in Subsection 217(a) above.	P	P	P	P	P	P	P	P	P
(d) Philanthropic facility providing assistance of a charitable or public service nature.	P	P	P	P	P	P	P	P	P
(e) Child care facility providing less than 24-hour care for children by licensed personnel and meeting the open-space and other requirements of the State of California and other authorities.	P	P	P	P	P	C	P	P	
(f) Elementary school, either public or private. Such institution may include employee or student dormitories and other housing operated by and affiliated with the institution.	P	P	P	P	P	P	P	P	
(g) Secondary school, either public or private, other than a school having industrial arts as its primary course of study. Such institution may include employee or student dormitories and other housing operated by and affiliated with the institution.	P	P	P	P	P	P	P	P	
(h) Post-secondary educational institution for the purposes of academic, professional, business or fine-arts education, which institution has met the applicable provisions of Section 304.5 of this Code concerning institutional master plans. Such institution may include employee or student dormitories and other housing operated by and affiliated with the institution. Such institution shall not have industrial arts as its primary course of study	P	P	P	P	P	P	P	P	

	C-1	C-2	C-3-O	C-3-R	C-3-G	C-3-S	C-M	M-1	M-2
(i) Secondary or post-secondary educational institution, other than as specified in Subsection 217(g) and (h) above.						P	P	P	P
(j) Church or other religious institution. Such institution may include, on the same lot, the housing of persons who engage in supportive activity for the institution.	P	P	P	P	P	P	P	P	P
SEC. 218. RETAIL SALES AND PERSONAL SERVICES. The uses specified in this section shall not include any use first specifically listed in a subsequent section of this Code.									
(a) Retail business or personal service establishment, of a type which supplies new commodities or offers personal services primarily to residents in the immediate vicinity.	P	NA	NA	NA	NA	NA	NA	NA	NA
(b) Retail business or personal service establishment, not limited to sales or services primarily for residents in the immediate vicinity, and not restricted to sale of new commodities.		P	P	P	P	P	P	P	P
SEC. 219. OFFICES.									
(a) Professional offices.	P	P	P	P	P	P	P	P	P
(b) Business offices.	P	P	P	P	P	P	P	P	P
SEC. 220. LAUNDERING, CLEANING AND PRESSING.									
(a) Automatic laundry, as defined in Part II, Chapter V (Health Code) of the San Francisco Municipal Code.	P	P	P	P	P	P	P	P	P
(b) Establishment for hand ironing only, not employing more than five persons.		P	P	P	P	P	P	NA	NA
(c) Dry cleaning establishment, including pressing and other miscellaneous processing of clothes, where no portion of a building occupied by such use shall have any ventilating flue, exhaust pipe or other opening except fixed windows and exits required by law within 50 feet of any lot in any R district, and where:	P	NA	NA	NA	NA	NA	NA	NA	NA
1. The establishment has only a central cleaning unit with a rated load factor of no more than 40 pounds and operated by employees of the establishment; or,									
2. The dry cleaning is done by the customer using self-service cleaning units or equivalent equipment, where the total number of units does not exceed eight and their total aggregate capacity does not exceed 40 cubic feet; or,									
3. The establishment is a combination of the two foregoing types, with a central cleaning unit with a rated load factor of no more than 40 pounds, and no more than four self-service units the aggregate capacity of which shall not exceed 20 cubic feet.									
(d) Dry cleaning establishment, including pressing and other miscellaneous processing of clothes, where no portion of a building occupied by such use shall have any ventilating flue, exhaust pipe or other opening except fixed windows and exits required by law within 50 feet of any lot in any R district, and where:		P	P	P	P	P	P	NA	NA
1. The establishment has only a central cleaning unit with a rated load factor of no more than 60 pounds and operated by employees of the establishment; or,									
2. The dry cleaning is done by the customer using self-service cleaning units or equivalent equipment where the total number of units does not exceed 16 and their total aggregate capacity does not exceed 80 cubic feet; or,									
3. The establishment is a combination of the two foregoing types, with a central cleaning unit with a rated load factor of no more than 60 pounds, and no more than eight self-service units the aggregate capacity of which shall not exceed 40 cubic feet.									
(e) Steam laundry, when conducted within a completely enclosed building; provided, that no part of a building so occupied shall have any opening, other than fixed windows or exits required by law, within 50 feet of any R district.								P	P
(f) Cleaning or dyeing plant, when conducted within a completely enclosed building; provided, that no part of a building so occupied shall have any opening, other than fixed windows or exits								P	P

	C-1	C-2	C-3-O	C-3-R	C-3-G	C-3-S	C-M	M-1	M-2
required by law, within 50 feet of any R district.									
(g) Bag, carpet or rug cleaning, when conducted within a completely enclosed building; provided, that no part of a building so occupied shall have any opening, other than fixed windows or exits required by law, within 50 feet of any R district.								P	P
SEC. 221. ASSEMBLY AND ENTERTAINMENT.									
(a) Club house.	P	P	P	P	P	P	P	P	P
(b) Lodge building.	P	P	P	P	P	P	P	P	P
(c) Meeting hall.	P	P	P	P	P	P	P	P	P
(d) Theatre, except as specified under Subsection (k), below.		P	P	P	P	P	P	P	P
(e) Recreation building.	P	P	P	P	P	P	P	P	P
(f) Amusement enterprise, including billiard hall, dance hall, night club, bowling alley, skating rink, shooting gallery, when conducted within a completely enclosed building; provided, (1) that incidental noise is reasonably confined to the premises by adequate sound-proofing or other device, and (2) that no portion of a building occupied by such use shall have any opening, other than fixed windows and exits required by law, within 50 feet of any R district.		P	P	P	P	P	P	P	P
(g) Private non-commercial recreational open use.	P*	P*			P	P	P	P	P
(h) Amusement park, and related commercial amusement enterprises not conducted in completely enclosed buildings; provided, that the use lawfully existed at the effective date of this Code, or is so located that (1) the premises are not less than 200 feet from any R district, and (2) the aggregate area in the same or adjoining blocks occupied by existing amusement enterprises is in excess of five acres.		P*					NA	NA	NA
(i) Commercial open-air sports stadium or arena, if conducted on premises not less than 200 feet from any R district.						C	P	P	P
(j) Circus, carnival, or other amusement enterprise not conducted within a building, if conducted on premises not less than 200 feet from any R district.						C	P	P	P
(k) Adult entertainment enterprise, as specified in (i), (ii) and (iii) below, provided that the use is so located that the premises upon which it is conducted are not less than 1,000 feet from the premises of any other adult entertainment enterprise: (i) Adult bookstore, as defined by Section 791 of Part II, Chapter VIII of the San Francisco Municipal Code (Police Code); (ii) Adult theater, as defined by Section 791 of Part II, Chapter VIII of the San Francisco Municipal Code (Police Code); (iii) Encounter studios, as defined by Section 1072.1 of Part II, Chapter VIII of the San Francisco Municipal Code (Police Code).	P	P	P	P	P	P	P	P	P
SEC. 222. HOME AND BUSINESS SERVICES. The term "shop" as used in this section shall include only the establishments of artisans dealing at retail directly with the consumer and concerned primarily with custom trade.									
(a) Household repair shop.		P	P	P	P	P	P	P	P
(b) Interior decorating shop.		P	P	P	P	P	P	P	P
(c) Upholstering shop.		P	P	P	P	P	P	P	P
(d) Sign painting shop.		P	P	P	P	P	P	P	P
(e) Carpenter shop.		P			P	P	P	P	P
(f) Office of a building, plumbing, electrical, painting, roofing, furnace or pest control contractor, including storage of incidental equipment and supplies entirely within the same building, where provision is also made entirely within the structure for parking, loading and unloading of all vehicles used. (See also Section 225.)		P			P	P	P	P	P
(g) Catering establishment.		P	P	P	P	P	P	P	P
(h) Printing shop.		P	P	P	P	P	P	P	P
(i) Newspaper publication.		P	P	P	P	P	P	P	P
(j) Blueprinting shop.		P	P	P	P	P	P	P	P
SEC. 223. AUTOMOTIVE.									
(a) Sale or rental of new or used au-		P	P	P	P	P	P	P	P

Table 2-2, continued

	C-1	C-2	C-3-O	C-3-R	C-3-G	C-3-S	C-M	M-1	M-2
tomobiles, when conducted entirely within an enclosed building.									
(b) Sale or rental of new or used trucks, when conducted entirely within an enclosed building.		P			P	P	P	P	P
(c) Lot for sale or rental of new or used automobiles.		C*			C	C	P	P	P
(d) Lot for sale or rental of new or used trucks.		C*			C	C	P	P	P
(e) Sale or rental of new or used automobile trailers.		C*			C	C	P	P	P
(f) Automobile service station for the sale and dispensing of gasoline, other motor fuels and lubricating oil directly into motor vehicles. The following activities shall be permitted at such a service station if normally conducted entirely within an enclosed building having no openings other than fixed windows or exits required by law within 50 feet of any R district:	P*	NA			NA	NA	NA	NA	NA
1. The sale and dispensing of greases and brake fluids, including motor vehicle lubrication; and the sale or installation of tires, batteries and other accessories;									
2. Miscellaneous minor servicing and adjusting, which may include brakes, electrical equipment, fan belt, head lamps, spark plugs, air filter, distributor points, carburetor, and generator charging rate;									
3. Installation of lamp globes, spark plugs, oil filter or filtering element, windshield wiper blades and motors, radiator hose (without removal of radiator or water pump), battery cables and fan belt;									
4. The servicing and repairing of tires and batteries;									
5. The installation and servicing of smog control devices; and									
6. Automobile washing and polishing of an incidental nature, when performed primarily by hand and not including the use of any mechanical conveyor, blower or steam cleaning device.									
(g) Automobile service station as described above, with the following minor automobile repairs permitted therewith if conducted entirely within an enclosed building having no openings other than fixed windows or exits required by law within 50 feet of any R district:		P*			P	P	P	P	P
1. Tuneup, including the repair or replacement of distributors, spark plugs and carburetors;									
2. Brake repair;									
3. Shock absorber replacement;									
4. Muffler exchange, with no open flame or torch;									
5. Wheel balancing and alignment;									
6. Wheel bearing and seals replacement;									
7. Replacement of universal joints;									
8. Radiator mounting and dismounting, with repairs done elsewhere;									
9. Clutch adjustments;									
10. Repair or replacement of water pumps;									
11. Repair or replacement of generators, alternators and voltage regulators;									
12. Repair or replacement of starters;									
13. Repair or replacement of fuel pumps;									
14. Such other repairs as may be designated by the Chief of the San Francisco Fire Department as minor repairs under Paragraph 8.09(a)(5)(o) of Part II, Chapter IV (Fire Code) of the San Francisco Municipal Code.									
(h) Repair garage for minor automobile repairs, limited to those repairs and other activities permitted at an automobile service station as described above, and in addition the following minor automobile repairs; all such repairs and other activities shall be conducted entirely within an enclosed building having no openings other than fixed windows or exits required by law within 50 feet of any R district.		P			P	P	P	P	P
1. Body and fender repair limited to replacement of parts and spot paint spraying, and									

	C-1	C-2	C-3-O	C-3-R	C-3-G	C-3-S	C-M	M-1	M-2
2. Removal and replacement of engines, transmissions and differentials, with repairs to these components done elsewhere.									
(i) Repair garage for the following major automobile repairs, if conducted entirely within an enclosed building having no openings other than fixed windows or exits required by law within 50 feet of any R district:						P		P	P
1. Internal engine repair or rebuilding;									
2. Repair or rebuilding of transmissions, differentials or radiators;									
3. Reconditioning of badly worn or damaged motor vehicles or trailers;									
4. Collision service, including body, frame or fender straightening or repair; and									
5. Full body paint spraying.									
(j) Automobile wash, when providing on the premises a reservoir of vehicle storage and standing area, outside the washing facilities, equal to at least ¼ the hourly capacity in vehicles of such facilities; provided, (1) that incidental noise is reasonably confined to the premises by adequate soundproofing or other device, and (2) that complete enclosure within a building may be required as a condition of approval, notwithstanding any other provision of this Code; but the foregoing provisions shall not preclude the imposition of any additional conditions pursuant to Section 303 of this Code.		C*			C	C	C	P	P
(k) Tire recapping, if conducted on premises not less than 200 feet from any R district.						P	P	P	P
(l) Parking lot, as regulated in Sections 155, 156 and 157 and other provisions of Article 1.5 of this Code.	C*	P*	C	C	C	P	P	P	P
(m) Storage garage open to the public for passenger automobiles, as regulated in Sections 155, 156 and 157 and other provisions of Article 1.5 of this Code, where such storage garage is not a public building requiring approval by the Board of Supervisors under other provisions of law and is completely enclosed.	C	P	C	C	C	C	P	P	P
(n) Storage garage open to the public for passenger automobiles, as regulated in Sections 155, 156 and 157 and other provisions of Article 1.5 of this Code, where such storage garage is not a public building requiring approval by the Board of Supervisors under other provisions of law and is not completely enclosed.	C*	C*	C	C	C	C	P	P	P
(o) Storage garage open to the public for passenger automobiles, as regulated in Sections 155, 156 and 157 and other provisions of Article 1.5 of this Code, where such storage garage is a public building requiring approval by the Board of Supervisors under other provisions of law.	P*	P*	P	P	P	P	P	P	P
(p) Major (non-accessory) parking garage not open to the public, as defined in Section 158 and as regulated therein and in Sections 155 and 157 and other provisions of Article 1.5 of this Code.	C	P	C	C	C	C	P	P	P
(q) Parcel delivery service, limited to facilities for the unloading, sorting and reloading of local retail merchandise for home deliveries, where the operation is conducted entirely within a completely enclosed building; including garage facilities for local delivery trucks, but excluding repair shop facilities.		C	C	C	C	NA	NA	NA	NA
(r) Parcel delivery service, not subject to the above limitations.						P	P	P	P
(s) Ambulance service.		C			C	P	P	P	P
(t) Storage garage for commercial passenger vehicles and light delivery trucks.					C	P	P	P	P
(u) Storage yard for commercial vehicles or trucks, if conducted within an area completely enclosed by a wall or concealing fence not less than six feet high.						C	P	P	P
(v) Truck terminal facility, if located not less than 200 feet from any R District.								C	C
SEC. 224. ANIMAL SERVICES.									
(a) Animal hospital or clinic, if conducted entirely within an enclosed building; not including a commercial kennel as specified below.		C			C	C	C	P	P

	C-1	C-2	C-3-O	C-3-R	C-3-G	C-3-S	C-M	M-1	M-2
(b) Animal hospital or clinic, if conducted on premises not less than 200 feet from any R district.							P	P	P
(c) Commercial kennel, if conducted on premises not less than 200 feet from any R district. A commercial kennel shall mean any commercial or business premises or other premises where dogs are boarded for compensation or are cared for or trained for hire or are kept for sale or bred for sale, where the care, breeding or sale of the dogs is the principal means of livelihood of the occupants of the premises.							P	P	P
(d) Riding academy or livery stable, if conducted on premises not less than 200 feet from any R district.							P	P	P
SEC. 225. WHOLESALING, STORAGE, DISTRIBUTION AND OPEN-AIR HANDLING OF MATERIALS AND EQUIPMENT.									
(a) Storage building for household goods.		C		C	C	P	P	P	P
(b) Wholesale establishment when conducted entirely within an enclosed building, not including a storage warehouse.			P	P	P	P	P	P	P
(c) Wholesale storage warehouse, except for storage of inflammables.						P	P	P	P
(d) Bulk storage of inflammable or highly combustible materials.									P
(e) Bulk storage of explosives.									C
(f) Cold storage plant, when conducted within a completely enclosed building; provided, that no part of a building so occupied shall have any opening, other than fixed windows or exits required by law, within 50 feet of any R district.								P	P
(g) Grain elevator.									P
(h) Dairy products distribution plant, where provision is made for off-street parking of all vehicles used, and all operations including loading and unloading are conducted entirely within an enclosed building. (See also Section 226.)						C	C	NA	NA
(i) Lot for sale of new or used merchandise, not including any use first specifically listed below.							P	P	P
(j) Service yard for public utility, or public use of a similar character, if conducted entirely within an area completely enclosed by a wall or concealing fence not less than six feet high.							P	P	P
(k) Contractor's storage yard or yard for rental of contractors' equipment if conducted within an area enclosed by a wall or concealing fence not less than six feet high.								P	P
(l) Yard for storage or sale of building materials or lumber, livestock feed, or coal, if conducted within an area enclosed by a wall or concealing fence not less than six feet high.								P	P
(m) Stone or monument yard, if conducted within an area enclosed by a wall or concealing fence not less than six feet high.								P	P
(n) Storage within a completely enclosed building of junk, waste, second hand, discarded or salvaged materials, excluding automobile wrecking operations as defined in this Section 225; provided, that no part of a building so occupied shall have any opening, other than fixed windows or exits required by law, within 50 feet of any R district.								P	P
(o) Junk yard, which shall mean an outdoor space where junk, waste, discarded or salvaged materials are stored or handled, including house wrecking yards, used lumber yards and places or yards for storage of salvaged house wrecking and structural steel materials and equipment; excluding automobile wrecking operations as defined in this Section 225, yards or establishments for the sale, purchase or storage of used cars or machinery in operable condition, and the processing of used, discarded or salvaged materials as part of a permitted manufacturing operation in the same premises.									P
(p) Automobile wrecking operation; provided, (1) that there shall be sufficient working space on the property to permit proper functioning of the operation without use of any public right-of-way for storage of inoperable vehicles or parts, and (2) that the operation shall be clearly separated from adjacent prop-								C	C

	C-1	C-2	C-3-O	C-3-R	C-3-G	C-3-S	C-M	M-1	M-2
erties and public rights-of-way. No automobile wrecking operation lawfully existing at the effective date hereof shall be continued more than three years from said date unless a conditional use authorization for such operation has been granted pursuant to this Code; provided, however, that no such automobile wrecking operation eligible for governmental payments to assist relocation shall be continued more than one and one-half years from said effective date unless a conditional use authorization for such operation has been granted pursuant to this Code. The term "automobile wrecking operation" as used herein shall mean the disassembling, dismantling, junking or "wrecking" of motor vehicles of any type, or the storage of such vehicles not in operable condition.									
SEC. 226. MANUFACTURING AND PROCESSING.									
(a) Light manufacturing uses, involving only the assembly, packaging, repairing or processing of previously prepared materials, which are conducted within a building but do not occupy the ground story of any building; provided, (1) that no part of a building so occupied shall have any opening, other than fixed windows and exits required by law, within 50 feet of any R district; (2) that the mechanical equipment required for such uses, together with related floor space used primarily by the operators of such equipment, shall not in the aggregate occupy more than ¼ of the gross floor area of the building in which the uses are located; and (3) that no machine shall be used that has more than five horsepower capacity.			P	P	P	P	P	NA	NA
(b) Light manufacturing which occupies not more than ½ the ground story of the building and involves or requires no machine that has more than five horsepower capacity, if conducted entirely within an enclosed building, provided, that no part of a building so occupied shall have any opening, other than fixed windows and exits required by law, within 20 feet of any R district.						P	P	NA	NA
(c) Light food processing for delicatessen, catering or restaurant supply, if conducted entirely within an enclosed building; provided, that no part of a building so occupied shall have any opening, other than fixed windows or exits required by law, within 20 feet of any R district.						P	P	NA	NA
(d) Light manufacturing, not including any use first specifically listed below.								P	P
(e) Industrial or chemical research or testing laboratory, not involving any danger of explosions.			P	P	P	P	P	P	P
(f) Experimental laboratory.						C	C	P	P
(g) Battery manufacture, if conducted on premises not less than 200 feet from any R district.							P	P	P
(h) Any of the following uses, when conducted within a completely enclosed building; provided, that no part of a building so occupied shall have any opening, other than fixed windows or exits required by law, within 50 feet of any R district:								P	P
1. Automobile assembling;									
2. Bottling plant, brewery, dairy products plant, malt manufacturing or processing or malt products plant;									
3. Ice manufacturing plant;									
4. Concrete mixing, concrete products manufacture;									
5. Electric foundry or foundry for non-ferrous metals;									
6. Metal working or blacksmith shop; excluding presses of over 20 tons capacity and machine operated drop hammers;									
7. Enameling, lacquering, wholesale paint mixing from previously prepared pigments and vehicles;									
8. Woodworking mill, manufacture of wood fibre, sawdust or excelsior products not involving chemical processing.									
(i) Manufacture of cereals, distilled liquors, felt or shoddy, hair or hair products, pickles, sauerkraut, vinegar, yeast, soda or soda compounds, structural clay products, meat products, not									P

Table 2-2, continued

	C-1	C-2	C-3-O	C-3-R	C-3-G	C-3-S	C-M	M-1	M-2
including any use first specifically listed below.									
(j) Flour mill.									P
(k) Sugar refinery.									P
(l) Wool pulling or scouring.									P
(m) Blast furnace, rolling mill, smelter.									C
(n) Manufacture of corrosive acid or alkali, cement, gypsum, lime, plaster of paris, explosive, fertilizer, glue or gelatine from fish or animal refuse.									C
(o) Production or refining of petroleum products.									C
(p) Steam power plant.								P	P
(q) Shipyard.									P
(r) Live storage, killing or dressing of poultry or rabbits for retail sale on the premises, if conducted on premises not less than 200 feet from any R district.							P	P	NA
(s) Live storage, killing or dressing of poultry or rabbits, if conducted on premises not less than 200 feet from any R district, without limitation as to nature of sale.									P
(t) Stockyard, livestock feed yard, abattoir.									C
(u) Rendering or reduction of fat, bones or other animal material, where adequate provision is made for the control of odors through the use of surface condensers and direct flame afterburners or equivalent equipment.								C	C
(v) Incineration of garbage, refuse, dead animals or parts thereof.									C
(w) The following uses, when located not less than 500 feet from any R district:									P
1. Manufacture, refining, distillation or treatment of any of the following: abrasives, acid (non-corrosive), alcohol, ammonia, asbestos, asphalt, bleaching powder, candles (from tallow), celluloid, chlorine, coal, coke, creosote, dextrine, disinfectant, dye, enamel, gas carbon or lamp black, gas (acetylene or other inflammable), glucose, insecticide, lacquer, linoleum, matches, oil cloth, oil paint, paper (or pulp), perfume, plastics, poison, potash, printing ink, refuse mash or refuse grain, rubber (including balata or gutta percha or crude or scrap rubber), shellac, shoe or stove polish, soap, starch, tar, turpentine, varnish;									
2. Curing, smoking or drying fish, manufacture of fish oil;									
3. Tanning or curing of raw hides or skins;									
4. Foundry, structural iron or pipe works, boiler making where riveting is involved, locomotive works, round-house or railroad shop.									

SEC. 227. OTHER USES.	C-1	C-2	C-3-O	C-3-R	C-3-G	C-3-S	C-M	M-1	M-2
(a) Greenhouse or plant nursery.	P*	P*				P	P	P	P
(b) Truck gardening, horticulture.	P*	P*					P	P	P
(c) Mortuary establishment.		C			C	C	P	P	P
(d) Public structure or use of a non-industrial character, when in conformity with the Master Plan. Such structure or use shall not include a storage yard, incinerator, machine shop, garage or similar use.	P	P	P	P	P	P	P	P	P
(e) Utility installation, public service facility, excluding service yard; provided that operating requirements necessitate location within the district.	P*	P*	C	C	P	P	P	P	P
(f) Railroad facility, other than as described in Section 226.	C*	C*	C	C	C	C	C	P	P
(g) Landing facility for aircraft.	C*	C*	C	C	C	C	C	C	C
(h) Wireless transmission facility.	C*	C*	C	C	C	C	C	P	P
(i) Sale or lease sign, as defined and regulated by Article 6 of this Code.	P*	P*	P	P	P	P	P	P	P
(j) General advertising sign, as defined and regulated by Article 6 of this Code.		P*	P	P	P	P	P	P	P
(k) Access driveway to property in any C or M district.	P*	P*	P	P	P	P	P	P	P
(l) Planned Unit Development, as defined and regulated by Section 304 and other applicable provisions of this Code.	C	C	C	C	C	C	C	C	C
(m) Any use that is permitted as a principal use in any other C or M district, without limitation as to enclosure within a building, wall or fence.									P
(n) Temporary uses, as specified in and regulated by Sections 205 through 205.2 of this Code.	SEE SECTIONS 205 THROUGH 205.2								

Source: San Francisco City Planning Code

TABLE 2-3

Floor Area Ratios Permitted in Zoning Districts

Zoning District	FAR
RH-1(D), RH-1, RH-1(S), RH-2, RH-3. RM-1, RM-2, RC-1, RC-2	1.8[1]
RM-3, RC-3, C-1, C-2	3.6[2]
RM-4, RC-4	4.8
C-3-O	14.0
C-3-R, C-3-G	10.0
C-3-S	7.0
C-M	9.0
M-1, M-2	5.0

[1]Does not apply to dwellings.
[2]In C-2 districts, basic FAR is 4.8 where the nearest residential district is RM-4 or RC-4 and 10.0 where the C-3 district is closer than any R district.

Note: Some other special provisions apply. Floor area bonuses are available in districts other than C-3 based on corner or interior characteristics of lot and in C-3 districts based on development features.

Source: San Francisco City Planning Code

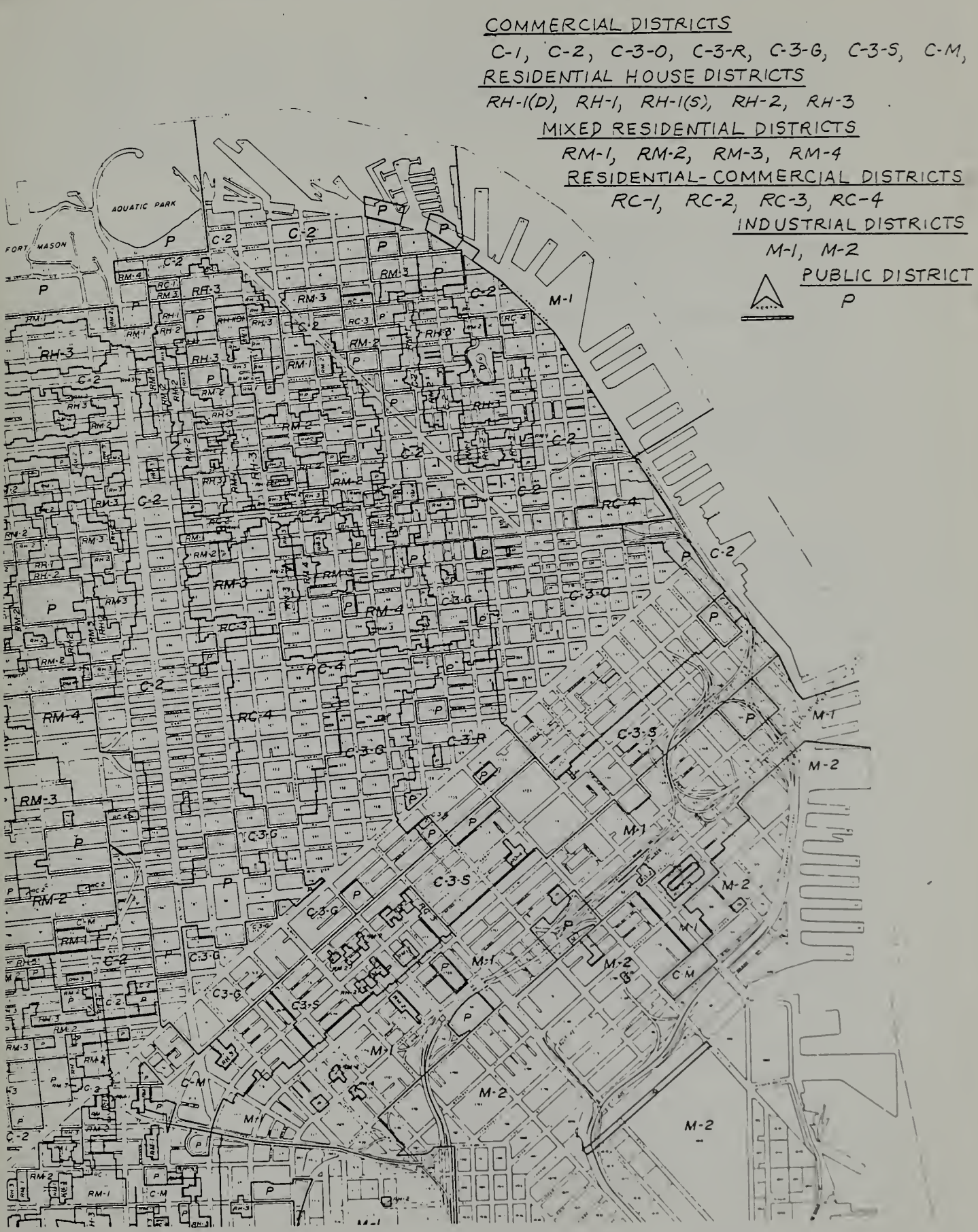
> districts provide comparison shopping goods and services on a general or specialized basis to a citywide or a regional market area, complementing the main area for such types of trade in downtown San Francisco.

Based on this description, it is likely that some C-2 districts gain some benefit from agglomeration while others do not. The manufacturing districts are included in the list of benefiting zones because they permit the development of office and retail uses as well as the types of support and industrial activities that benefit from proximity to the central business agglomeration and the degree of accessibility to labor and customers it provides. (The public district is excluded because, although it permits office uses for government agencies, its users cannot be assessed by the City and County of San Francisco). The zoning designations on land in the northeastern section of San Francisco (the area that receives a generally high level of transit service, as shown in Figures 2-3 and 2-4) are mapped in Figure 2-5.

AREA RECEIVING A SPECIAL LEVEL OF TRANSIT SERVICE AND ZONED TO BENEFIT FROM AGGLOMERATION: THE SPECIAL BENEFIT AREA

The area in which special levels of service coincide with the zoning designations that allow uses which benefit from agglomeration is the area that receives a special benefit (that is, an enhancement of land values) from MUNI. The area in which those two conditions coincide is

FIGURE 2-5: Downtown Area Zoning Districts



Source: Zoning Map of the City and County of San Francisco.

shown in Figure 2-6. Boundary lines were drawn after a visual inspection of the area, according to three criteria, all of which must apply to an area for it to be included in the district:

1. All land in the district must be within one-quarter mile of a MUNI route served by at least two bus lines that runs through a grid square included in the large contiguous area of squares with the highest 10 percent of capacity. As used here, "bus" is a generic term and refers to any MUNI mode. The 38 Geary line, which includes the 38, 38L, 38AX and 38BX routes, is considered to comprise "at least two" lines on the Geary-O'Farrell couplet.

2. All land in the district must be included in one of the following zoning districts: RC-2, RC-3, R-C-4, C-2, C-3-O, C-3-R, C-3-G, C-3-S, C-M, M-1, M-2.

3. All land in the district must be part of the downtown San Francisco agglomeration of businesses. This requirement means that the majority of uses in the included areas must be functionally linked to the downtown or serve a regional clientele. Wherever feasible, zoning district boundaries are used to define the edge of the agglomeration. Where zoning district boundaries were not available - for example, along Van Ness Avenue to the north and Market Street to the west - the district was limited to the area

FIGURE 2-6

Special Benefit Area

within one quarter-mile walking distance of intensive concentration of use. On Van Ness Avenue, the northern edge of the concentration is considered to be Sacramento Street; on Market Street, the western edge of the concentration is the intersection of Market and Van Ness.

CHAPTER 3

THE QUANTIFIABLE PORTION OF THE SPECIAL BENEFIT

BACKGROUND

The special benefit of extra MUNI service to the downtown area is related to the land value increase in that area that results from the interaction among transportation, agglomeration and land value. Part of this benefit may be readily quantified: to the extent that MUNI reduces workers' commute costs, it also reduces the wage rates necessary to obtain (or retain) labor for firms within the agglomeration, and thereby increases the amount of rent such firms can afford (or are willing) to pay. Since the increase in obtainable rents translates into an increase in land values, the amount by which commute costs for workers who use MUNI are reduced indicates the amount of this portion of the special benefit. This portion of the special benefit is estimated in this chapter.

The remaining larger portion of the special benefit is not readily quantifiable. It is related to the increase in transportation costs for non-workers (i.e., customers and clients) traveling to and within downtown San Francisco and all travelers during non-peak commute hours, the reduction of need for parking facilities downtown because MUNI serves the area at such a high level, the minimization of congestion and enhancement of

agglomeration benefits in the CBD. This portion of the benefit is discussed in qualitative terms in Chapter 5.

ESTIMATE OF TRANSPORTATION COST SAVINGS YIELDED BY SPECIAL LEVEL OF MUNI SERVICE

The transportation cost savings yielded by the special level of MUNI service to the area defined in Chapter 2 is equal to the change in transportation costs for all travelers to downtown who would have to use other means of transportation if that service were unavailable plus any changes in transportation costs for other travelers to downtown that might occur if MUNI service to downtown were reduced. The procedure for estimating these changes and results of the analysis are described below.

Step 1: Quantify the Difference in Level of MUNI Service During the Peak Period

The morning peak period was chosen as the time during which transportation cost differences for travelers to downtown should be estimated because it is the primary time during which capacity on MUNI is obviously constrained.* The morning peak period was defined to include all MUNI runs scheduled to be completed between 7:00 and 9:00 a.m.

*This approach results in a focus of the estimate of transportation costs on workers in daytime jobs. It was chosen because it yields a conservative estimate of the change (by considering only travel during a period of obvious MUNI capacity constraint) but is not meant to suggest that reductions in service on downtown-destined lines would not also affect transportation costs for peak period non-workers and for midday travelers, including retail customers, businesses' clients and tourists.

TABLE 3-1

Capacity of MUNI Lines Entering the MUNI Special Benefit Area During Inbound Peak Period (7 a.m. - 9 a.m.)

Line	Capacity	Line	Capacity	Line	Capacity
1	825	21	1,350	47	1,800
1x	1,512	25	1,080	55	2,592
2	1,008	26	720	59	816
3	975	27	504	60	884
4	675	30	1,800	61	1,224
5	1,875	30x	1,440	66	504
6	1,125	31	936	71	792
7	1,050	31x	1,080	72	648
8	1,425	32	864	80	1,008
9	1,050	38	1,224	83	228
11	1,080	38L	1,224	J[3]	3,328
12	1,050	38AX	936	K	2,992
14	2,025	38BX	648	L	4,624
14x	1,152	40x	1,512	M	2,584
14GL	504	41 [1]	1,800	N	4,352
15	1,872	41 [2]	864		
16x	1,152	42	720	TOTAL	69,437
17x	576	45	1,368		

[1]Motor Coach ("41 Union").
[2]Trolley Coach ("41 Union-Howard").
[3]Tabulated before LRV service went into effect.

Source: San Francisco Municipal Railway

The difference between MUNI capacity with the current, special level of service to the benefit area and MUNI capacity with average service is the difference between the number of commuters that could be carried into the benefit area in each case. MUNI capacity into the area with the current level of service is the sum of the peak period capacity of all the lines entering the area at the points where they enter. This capacity is 69,437 people, as shown in Table 3-1. MUNI capacity into the area with the average citywide level of service is equal to the average (median) capacity for all grid squares multiplied by the number of grid squares crossed by the boundary line of the benefit area. This capacity is 38,880 people, or 30,557 fewer people than can be carried by the current level of service.

Step 2: Estimate the Number of Peak Period Riders Displaced if MUNI Service to the Benefit Area Were Reduced to the Citywide Average

In order to estimate the change in workers' transportation costs that would result if MUNI's peak period inbound capacity were reduced by 30,557, it is necessary to estimate how many riders would be displaced if that capacity were eliminated; in other words, it is necessary to find out what proportion of that capacity is currently being used.

The number of workers using MUNI during the morning peak period may be estimated if the number of workers in the

downtown area and the proportion of those workers who use MUNI is known. Based on the ABAG data base for 1975 modified to account for known major buildings added in the special benefit area, it is estimated that approximately 270,000 workers hold jobs in the benefit area (outlined in Figure 2-6).[1]

Of these 270,000 workers, how many use MUNI during the morning peak hour? Guidelines issued by the San Francisco Department of City Planning, Office of Environmental Review, indicate that 28.8% of downtown workers commute via MUNI. A survey of employees expected to work in four new office buildings, conducted to assess the impacts of those buildings on transit and auto circulation, indicate that 27.1% of those workers currently use MUNI to travel to work.[2] If the smaller proportion - 27.1% -

[1] This estimate includes workers in ABAG zones 417 through 430 (440 zone system) plus estimated employees at One Market Plaza, Three Embarcadero, 350 California, 45 Fremont, 201 California, 180 Montgomery, 333 Market, State Compensation Insurance Fund, Bank of America Data Center, Howard and Main, 444 Market, Hibernia Bank and Pacific III Apparel Mart.

[2] Surveys conducted for Federal Reserve Bank EIR (EE 78.207), Crocker Bank National Headquarters EIR (EE 78.298), 101 California EIR (EE 78.27) and Pacific Gateway EIR (EE 78.61). MUNI use is a function of both residence and mode; all four EIR's were used to estimate residential distribution and the Crocker Bank EIR, considered the most representative because it surveyed workers in a variety of downtown work locations, was used to assign modal split.

of downtown workers commute via MUNI, then approximately 73,170 workers use that mode. Because this figure exceeds the measured peak period capacity by 3,733, it may be assumed either that MUNI operates at greater-than-capacity conditions during the morning peak period, or that the "extra" 3,733 workers commute during off-peak hours. The latter assumption is used, for conservatism, in this analysis; thus, it is assumed that 30,557 peak period riders would be displaced if MUNI service to the special benefit area were reduced to the citywide average.

Step 3: Estimate Transportation Cost Savings Afforded by the Current Extra MUNI Service

As noted on page 5 , the transportation cost savings afforded by extra MUNI service is at least equal to the change in travel costs that would result if MUNI service were unavailable. More specifically, the savings afforded by the current special level of MUNI service is the cost to 30,557 workers of commuting by other available means less their current commute costs. The current annual commute cost may be approximated by assuming that each MUNI commuter buys a Fast Pass for $16 per month, for an annual commute cost of $192 per person or $5,866,944 for 30,557 people.

The "cost of commuting by other available means" is presented here based on a particular assumption that all

displaced MUNI riders remain in their current residences and commute to work by auto rather than public transit. (An alternative set of assumptions - that the reduction of MUNI service to downtown would cause the residential base of the downtown workforce to shift to the East Bay and other areas from which public transit is available - is discussed in the next chapter of this report.)

To approximate the cost of automobile transportation, the number of autos to be used must first be estimated. Data from the 1970 U. S. Census show that all workers who commuted to downtown San Francisco at that time averaged 1.15 riders per vehicle while workers who lived in San Francisco and commuted by auto to downtown averaged 1.24 riders per vehicle.[1] Respondents to the survey of Crocker Bank employees conducted for the environmental impact report for the bank's new northern California headquarters building indicated an average occupancy-per-commute-auto of 1.5 persons.[2] Assuming that this increase in the average vehicle occupancy is a response to increased parking and gasoline prices rather than a variation in travel behavior peculiar to Crocker employees and that displaced MUNI riders will exhibit similar average occupancy rates, the 30,557 displaced riders will require 20,371 autos for travel to work.

[1] The area north of Harrison and east of Van Ness.
[2] San Francisco Department of City Planning, Final Environmental Impact Report, Crocker National Bank Northern California Headquarters (EE 78.298), page 232.

As noted above, the cost of commuting by auto is equal to the cost of using the auto plus the cost of parking. The California State Automobile Association has compiled statistics on the cost of automobile use which indicate a range of 21.8 cents to 30.0 cents per mile for a vehicle driven 15,000 miles per year, depending on the size of the car, for operation in high-cost areas such as San Francisco. These figures are summarized in Table 3-2.

TABLE 3-2

Operating Costs for Automobiles*

Size of Vehicle	Cost per Mile
Sub-compact	21.8 cents
Compact	25.0
Intermediate	27.8
Standard	30.0

*High-cost areas. Autos driven 15,000 miles per year. Cars driven fewer miles have higher costs per mile.

Source: California State Automobile Association, Your Driving Costs, 1981 Edition.

It is assumed for this analysis that displaced MUNI riders will acquire and operate sub-compact cars. It is further assumed that the average trip to work will be a 5-mile round trip and that 250 round trips (5 days, 50 weeks) will be made each year by each car. The total cost of operating 20,371 autos would therefore equal $5,551,098.

It is also assumed for this analysis that the number of existing parking spaces in downtown San Francisco is in equilibrium with the current demand for spaces; in other words, whatever vacancy exists is required to avoid a situation in which the last drivers to arrive each day must search among parking lots for the last few available spaces. Therefore, new spaces must be provided to accommodate the 20,371 cars driven by the displaced MUNI riders. In order to effect construction (or provision) of these new spaces, the cost of parking in those spaces must be at least as great as the price of providing them. For conservatism, no vacancy rate is included in the cost estimate for additional parking.

To estimate the cost of providing parking spaces, the following estimates of land and construction costs and financing terms were made: (1) new parking spaces would be built in structures of six stories with an overall average size of 350 square feet per space (including actual spaces, aisles and ramps); (2) land for the structures could be acquired at a cost of $50 per square foot; (3) construction costs would average $37 per square foot; and (4) the entire cost of the structures would be financed by a 25-year debt with a 15% interest rate. This set of assumptions resulted in an annual cost of $2,455 per parking space, as shown in Table 3-3. For all 20,371 spaces needed, then, the cost would be $50,010,805. It may be noted that this cost does not include the price of operating the parking structures.

TABLE 3-3

Cost Estimate for New Parking Spaces
Cost per Space

Item	Cost
Land @ $50 per sq. ft.[1]	$ 2,916.67
Construction @ $37 per sq. ft.[2]	12,950.00
TOTAL	$ 15,866.67
Annual Payment to Amortize 25-year Debt at 15 Percent Interest	$ 2,454.56

[1]Assumes 350 square feet per space with land cost divided among six levels of parking. Effective land cost is therefore $8.33 per square foot.
[2]350 square feet per space.

Source: Gruen Gruen + Associates

Based on the costs of vehicle operations and parking and of commuting by MUNI estimated above, the transportation cost increase that would result if MUNI service to the special benefit area were reduced to the citywide average - and, concomitantly, the savings in transportation costs to area workers, customers and clients provided by the current level of MUNI service - is equal to at least $49,694,959. This cost is summarized in Table 3-4.

TABLE 3-4

Cost Savings to Downtown Commuters Resulting from Current Special Level of MUNI Service

Additional Cost of Commuting with Average MUNI Service	
Automobile Operation	
20,371 vehicles[1]	
250 round trips per year each[2]	$ 5,551,098
Parking	
20,371 vehicles[1]	
$2,455 per year each[3]	50,010,805
SUBTOTAL	$55,561,903
(Less) Current Cost of Commuting with Special MUNI Service	
30,557 riders @ $192 per year each[4]	5,866,944
NET CHANGE	$49,694,959

[1] 30,557 displaced MUNI riders at 1.5 riders per auto.
[2] 50 weeks, 5 trips per week, 5-mile round trip, 21.8 cents per mile (see Table 3-2).
[3] See Table 3-3.
[4] $16 Fast Pass for 12 months.

Source: Gruen Gruen + Associates

Step 4: Estimate Additional Costs to Other Commuters

In addition to the changes in transportation costs to displaced MUNI riders, as calculated in Steps 1 through

3, the ripple effects of those changes are likely to affect other commuters. One likely effect is a general increase in downtown parking fees. The annual fee of $2,455 required to pay for new parking places is equivalent to a monthly fee of $205. Parking is currently available in the downtown area at monthly rates ranging from $90 to $150. Depending on location and the proportion of new relative to existing parking, changes for some or all of the existing spaces will be increased. Table 3-5 illustrates the aggregate increase in transportation costs that would take place if the fees for various numbers of parking spaces were increased from their current levels to $205 per month, commensurate with the price of new parking spaces.

TABLE 3-5

Aggregate Annual Amount of Parking Rate Increases
(Dollars for all spaces)

Current Monthly Rate	Number of Spaces for Which Monthly Price is Raised to $205:			
	1,000	10,000	15,000	30,000
$ 90	$1,380,000	$13,800,000	$20,700,000	$41,400,000
100	1,260,000	12,600,000	18,900,000	37,800,000
115	1,080,000	10,800,000	16,200,000	32,400,000
125	960,000	9,600,000	14,400,000	28,800,000
150	660,000	6,600,000	9,900,000	19,800,000

Source: Gruen Gruen + Associates

Based on these figures, the total change in transportation costs for downtown workers resulting from a decrease in MUNI service would range between $50,354,959 (if only 1,000 existing spaces, with current monthly parking fees of $150 each, experience price increases) and $91,094,959 (if 30,000 existing spaces, with average monthly parking fees of $90 each, experience price increases).

CHAPTER 4

THE PERPLEXING MIRAGE: NEW DOWNTOWN WORKERS AND CAPACITY ON OTHER TRANSIT SYSTEMS

As noted in Chapter 3, a second response by commuters to a decrease in MUNI service to downtown could be a shift to commuting by other forms of public transit. The only possible immediate shift, of course, would be the utilization of BART between the Daly City and Embarcadero stations by commuters who currently use Mission Street and other nearby buses. In the longer term, however, it is conceivable that the residential base of the downtown San Francisco workforce would shift because workers would seek to commute by public transit wherever possible, and capacity on public transit would be available only on systems which serve riders traveling between San Francisco and areas outside the city. The critical issue for downtown will then be the ability of other Bay Area public transit systems to accommodate the increase in demand.

The initial section of this chapter tabulates the current unused capacity on other regional transit systems and evaluates the ability of those systems to carry the 30,557 workers who would have to find other means of commuting if MUNI service to the special benefit area were reduced to the citywide average. This comparison, however, is actually a mirage: by the time the residence

pattern of downtown employees has shifted enough to take maximum advantage of the available capacity, both the number of employees and the available capacity will have increased. Therefore, the second section of the chapter presents estimates of both those increases and evaluates the future ability of the other regional transit systems to meet commute demand if MUNI service to downtown is reduced.

CURRENTLY AVAILABLE CAPACITY ON OTHER BAY AREA PUBLIC TRANSIT SYSTEMS

In Chapter 3, it was estimated that 30,557 downtown workers would be displaced from MUNI if the current level of service to downtown were reduced to the citywide average. Information provided by staff at other Bay Area public transit systems indicate that only 16,460 of these workers could be accommodated by available unused capacity on those systems. The available capacity for each system is itemized in Table 4-1.

TABLE 4-1

Available (Unused) Capacity on Bay Area Transit Systems, Morning Peak Period

System	Unused Capacity
AC Transit	5,500
BART	
From East Bay	1,000
From Daly City	6,400
Golden Gate Bus	2,300
Golden Gate Ferry	800
SamTrans	460
Southern Pacific Railroad	0
TOTAL	16,460

Sources: AC Transit, BART, Golden Gate Transit, SamTrans (SamTrans operates SPRR).

INCREASE IN TRANSPORTATION COSTS IF COMMUTERS SWITCH TO OTHER TRANSIT SYSTEMS

The same type of analysis of increased transportation costs as was carried out in Chapter 3 may be completed for a scenario in which the available capacity on other systems is exactly absorbed by displaced MUNI riders (or their successors). For this case, the number of displaced MUNI riders* that could be accommodated by each of the other transit systems was identified, and the transportation cost increase for each rider (the new cost minus the cost of a Fast Pass) was estimated. Displaced riders who could not be accommodated on other systems were assigned to automobiles, at an average vehicle occupancy of 1.5 riders. Table 4-2 summarizes the current average fares paid by riders on other transit systems, and Table 4-3 derives the added transportation cost if all who can switch to other systems do and those who cannot be accommodated by other systems switch to autos. The table indicates a minimum increase in commute costs of $31,256,931, which is the minimum benefit of the current MUNI service to downtown if commuters switch to other public transit systems. If the potential increase in parking costs to other drivers, as shown in Table 3-5 (page 84), is included, the minimum benefit is estimated to fall between $31,916,931 and $72,656,931.

*These "displaced MUNI riders" are actually downtown worker equivalents; the terminology does not imply that current San Francisco residents will necessarily move to other areas to be able to ride other systems. Instead, San Francisco residents currently employed downtown could switch places of employment and be replaced in their downtown jobs by residents of other Bay Area communities.

TABLE 4-2

Estimates of Monthly Commute Costs on Other (non-MUNI) Transit Systems

System	Fare Information	Assumed Monthly Fare
AC Transit	Monthly passes available at $36 in zone 1, $45 in zone 2, $54 in zone 3. Vast majority sold in zone 1.	$36
BART	Average fare paid: East Bay $0.825 West Bay 0.655 Transbay 1.333 Trips exiting Daly City 0.959	$1.333 for 1000 pass. x 44 trips $0.655 for 6400 pass. x 44 trips
Golden Gate Bus	Trip origins and fares: Zone 1 (SF) 0 - Zone 2 20% $1.45 Zone 3 (San Rfl) 50% 1.75 Zone 4 (N.Mar.) 20% 2.05 Zone 5 (S.Son.) 7% 2.60 Zone 6 (S.Rosa) 3% 2.90 10% Discount with purchase of 20-ride commute book	$1.66 (composite of $1.84 less 10% discount) x 44 trips
Golden Gate Ferry	Commute book sells for $26.10 for 20 rides	$57.42
SamTrans-Bus	Average fare in June 1981 = $0.89 per trip	$0.89 x 44 trips

Source: AC Transit, BART, Golden Gate Transit, SamTrans.

TABLE 4-3

Increase in Commute Cost if Workers Absorb Available Capacity on Other Public Transit Systems

System	Number of Riders	New Cost	Old (MUNI) Cost [1]	Net Increase
BART				
From East Bay	1,000	$ 703,824[2]	$ 192,000	$ 511,824
From Daly City	6,400	2,213,376[3]	1,228,800	984,576
AC Transit	5,500	2,376,000[4]	1,056,000	1,320,000
Golden Gate Bus	2,300	2,015,904[5]	441,600	1,574,304
Golden Gate Ferry	800	551,232[6]	153,600	397,632
SamTrans	460	216,163[7]	88,320	127,843
Auto	14,097	25,633,045[8]	2,706,624	22,926,421
TOTAL	30,557	33,709,544	5,866,944	27,842,600

[1] $16 per month per rider.
[2] Average fare $1.333 per ride, 44 rides per month for 12 months.
[3] Average fare $0.655 per ride, 44 rides per month for 12 months.
[4] Average fare $36 per month for 12 months.
[5] Average fare $1.66 per ride, 44 rides per month for 12 months.
[6] Average fare $26.10 for 20 rides, 44 rides per month for 12 months.
[7] Average fare $0.89 per ride, 44 rides per month for 12 months.
[8] Average 1.5 riders per auto; average cost per auto based on operating cost of $0.218 per mile, 250 5-mile trips per year plus parking cost of $2,455 per year.

Source: Gruen Gruen + Associates

FUTURE TRANSIT CAPACITY ON OTHER TRANSIT SYSTEMS

The capacity of other transit systems - if MUNI capacity is not to be expanded, or is to decline - must be able to accommodate not only the current MUNI riders who would be displaced if service were reduced but also new employees commuting to work at new businesses and buildings in downtown San Francisco. To assess this capacity, it is first necessary to estimate the number of new workers expected in downtown San Francisco and then to compare that estimate to expected transit capacity.

Expectations of Employment

New employment in downtown San Francisco will result from the establishment of new businesses there. A recent study of 50 of the largest American cities completed by the Urban Land Institute[1] indicated that the best predictor of future downtown growth is the current size of downtown. This information suggests that future demand for building space in downtown San Francisco may be estimated based on historic data.

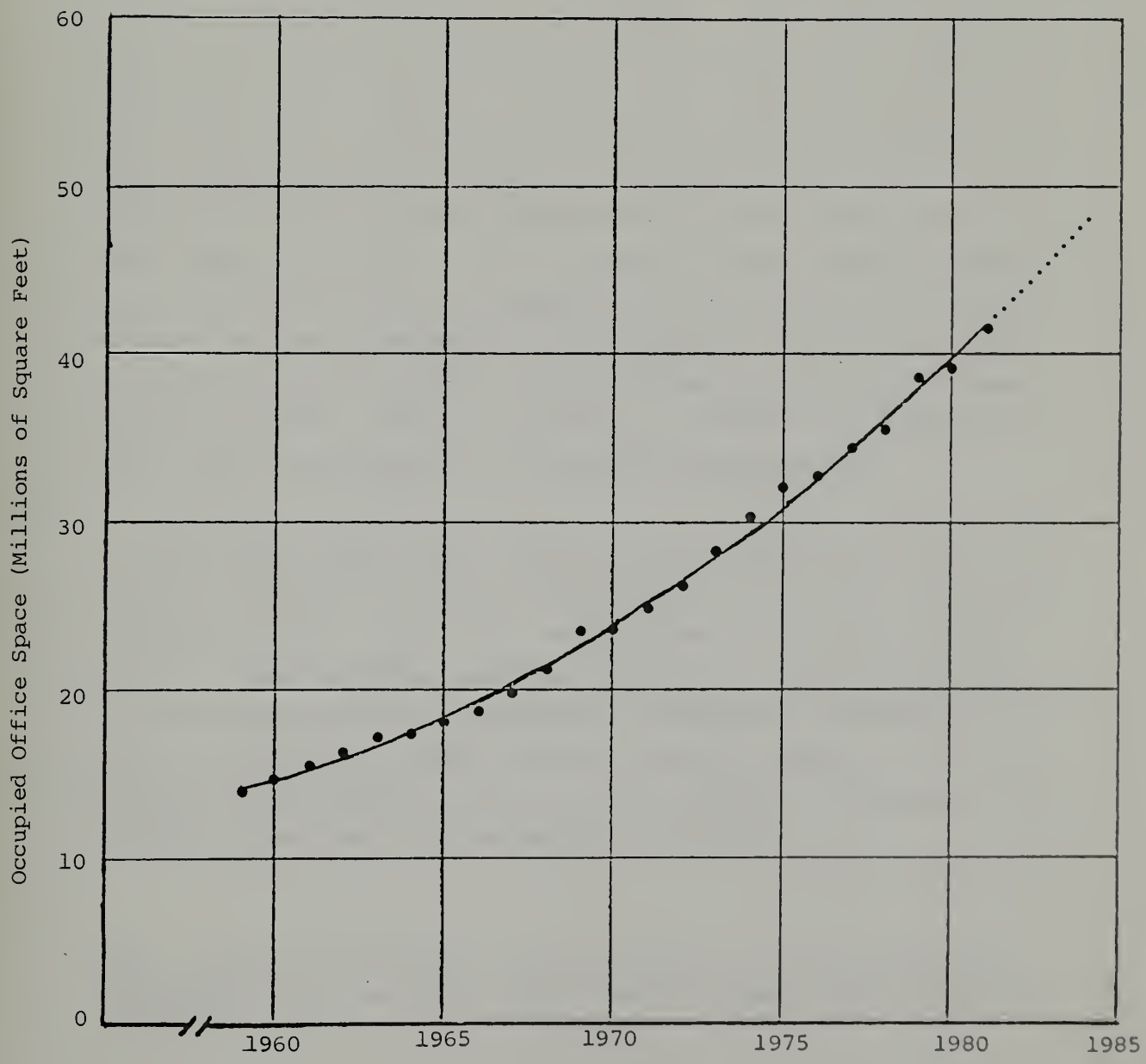
Figure 4-1 shows growth in occupied office space in downtown San Francisco over the past 22 years. The increase in occupied space may be interpreted as the demand for new space.[2] When the equation derived on page 34 is

[1] Urban Land Institute, op. cit.

[2] This interpretation would yield a conservative estimate of demand, because in an office market as tight as that in San Francisco in recent years, some firms will be unable to find suitable space and will locate elsewhere.

FIGURE 4-1

Actual and Predicted Demand for Office Space
in Downtown San Francisco: 1959 - 1984



Source: Gruen Gruen + Associates

applied to this pattern of growth, it is estimated that there will be demand for an additional 6,442,000 square between 1981 and 1984. This amount of space would be occupied by 28,630 workers, based on an average density of one worker per 225 square feet of office space.

Estimates of newly supplied office space - projects either under construction or in the final planning stages - are consistent with this estimate. The major office buildings currently under construction and their expected employment are listed in Table 4-4. The major office building projects which have received permit approval and their expected employment are listed in Table 4-5. The two tables indicate that, between projects which are already under construction or have received permits, room for a net increase of between 31,430 and 36,744 office workers may be expected in the downtown area by the end of 1984 if the new space is 100 percent occupied.* These figures do not include potential workers at buildings still being reviewed by the Planning Department.

It should be noted that office space expansions will be joined by growth of other commercial activities - such as planned hotels and hotel expansions, the new Nieman-Marcus - and that the expected increase in office employment is used here for purposes of estimation because proposed projects are most readily identifiable. The increase in employment used in this chapter should not be considered as the total expected increase.

*This estimate includes consideration of existing building space that must be demolished to make room for new buildings.

TABLE 4-4

Major Office Buildings Under Construction in in San Francisco, 1981-1983

Project	Year of Completion	Approximate Net Sq. Ft.	Estimated Employment[6]
Pacific Lumber Co.[2]	1981	97,398	507[7]
Four Embarcadero[2]	1981	772,000	4,200[7]
10 U.N. Square[2]	1981	72,000	320
530 Bush Street[2]	1981	60,000	260
Grant & Geary Streets[2]	1981	106,000	470
1625 Van Ness Avenue[3]	1981	80,000	360
Levi's Plaza[4]	1981	720,000	4,125[7]
Yerba Buena West[1]	1982	250,000	1,110
Crocker Center[2]	1982	656,000	2,620[8]-3,270
Federal Reserve[2]	1982	650,000	1,140[8]-2,300[8]
Pacific Gateway[1]	1982	488,000	2,500[8]-3,072[7]
150 Spear Street[1]	1982	274,525	1,220
Gift & Gourmet Mart[5] (Yerba Buena Center)	1982	200,000	890
Golden Gateway[2] Commons II	1982	90,000	400
Convention Plaza[2]	1982	336,000	1,190
101 California Street[2]	1983	1,200,000	3,700[8]-6,035[7]
Five Fremont Street[1]	1983	742,000	2,954[8]
SUBTOTAL		6,973,923	27,966-32,683
Estimated Employment in Buildings Demolished			4,600[9]
Net Increase in Employment			23,366-28,083

Table 4-4, continued

[1]The net square feet are taken from "Major Office Space Development Since 1945: San Francisco CBD", a table by the San Francisco Department of City Planning, January 1981.

[2]Completion date and net square feet from "San Francisco Office Buildings Planned or Under Construction 1981-1985" by Cushman & Wakefield of California, Inc., August 1981.

[3]Data received from the property owner, Morton Kirsch, Whereco Corp., in a telephone conversation with Gruen Gruen + Associates on August 3, 1981.

[4]The net square footage was obtained from the San Francisco Department of City Planning, "Major Office Space Development Since 1945: San Francisco CBD", January 1981. DAON Corporation provided an update for the year of completion.

[5]Mike Mann of the Redevelopment Agency of the City and County of San Francisco provided the square footage and percent leased information in a telephone conversation with Gruen Gruen + Associates, July 29, 1981. The net square footage listed in the table is the average of 100,000 to 300,000, the range Mr. Mann provided.

[6]Employment estimates by Gruen Gruen + Associates, based on an average of one employee per 225 square feet, unless otherwise noted.

[7]From Department of City Planning, Guidelines for Environmental Evaluation, Transportation Impacts, June 1980.

[8]From EIR for specific project.

[9]Assumes 180,000 square feet of office space demolished for every 1,180,000 square feet of new space built (based on Gruen Gruen + Associates, Fiscal Impacts of New Downtown High-rises on the City and County of San Francisco) and one employee per 225 square feet of space.

TABLE 4-5

Major San Francisco Office Projects Which Have Received Permit Approval[1]

Proposed Year of Completion	Project name	Net Sq. Ft.	Employment[3]
1982	141 Steuart	66,300	295
1983	550 Kearny	63,750	283
	Mirawa Center	68,000	302
	456 Montgomery	189,550	530-737[4]
	353 Sacramento	246,000	1,187[5]
	101 Montgomery	235,450	1,046
	Golden Gateway Commons III	87,550	389
1984	One Sansome	490,195	2,179
	50 U. N. Plaza	51,000	227
	25 Jessie	94,350	419
	Pacific III	282,200	1,254
	315 Howard	330,650	1,240-1,630[6]
	1601 Van Ness[2]	124,100	552
	TOTAL 1982-1984	2,329,095	9,903-10,500
	Estimated Employment in Buildings Demolished		1,579[7]
	Net Increase in Employment		8,324-8,921

[1]The net square footage figures assume an 85 percent efficiency (ratio of net to gross square feet). The 1984 subtotal excludes Five Fremont Center (which was included in the Department of City Planning's April 1st listing) because construction has commenced on this project.

[2]Mr. Gustave Allibert, Harrigan Weidenmuller Company, updated the information on 1601 Van Ness in a telephone conversation with Gruen Gruen + Associates, August 11, 1981.
[3]Employment estimated at one worker per 225 square feet, except as otherwise noted.
[4]530 estimated in environmental impact report; 737 estimated by Department of City Planning Transportation Section.
[5]Estimate by Department of City Planning Transportation Section.
[6]Estimated in environmental impact report.
[7]Assumes 180,000 square feet of office space demolished for every 1,180,000 square feet of new space built (based on Gruen Gruen + Associates, Fiscal Impacts of New Downtown High-rises on the City and County of San Francisco) and one employee per 225 square feet of space.

Sources: Table 3: Major Citywide Office Buildings - Permits Approved 4/1/81, San Francisco Department of City Planning, updated with information contained in "San Francisco Office Buildings Planned or Under Construction 1981-1985", Cushman & Wakefield of California, Inc., August 1981 and by DAON Corporation and Charles Gill; Gruen Gruen + Associates.

Expectations of Transit Capacity

Table 4-1, on page 88, indicated that other public transit systems that bring workers to downtown San Francisco currently have unused capacity available to accommodate 16,460 additional riders. Over the next several years, three of the systems - BART, AC Transit and Golden Gate Transit - have plans to add capacity that together would accommodate approximately 13,205 additional passengers, as shown in Table 4-6. It should be noted that the ability of these systems to provide the planned additional capacity will depend at least in part on the availability of federal funds, and that although SamTrans has no firm plans for expansion they may add service anyway.

TABLE 4-6

Potential Transit Capacity With No MUNI Expansions

System	Excess Capacity Available Now	Planned Expansions	Total Capacity Potentially Available
BART	7,400	8,600	16,000
AC Transit	5,500	605	6,105
Golden Gate-Bus	2,300	4,000	6,300
Golden Gate-Ferry	800	0	800
SamTrans	460	0	460
Southern Pacific	0	0	0
TOTAL	16,460	13,205	29,665

Source: BART, Golden Gate Transit, SamTrans, AC Transit, personal communications to Gruen Gruen + Associates.

Ability of Other Systems to Accommodate New Downtown Workers

The ability of the other Bay Area public transit systems to accommodate additional downtown workers must be evaluated for three different conditions: (1) a case in which all systems, including MUNI, accommodate the proportion of downtown workers they currently carry; (2) a case in which MUNI maintains its current level of service but does not expand; and (3) a case in which MUNI service to the downtown area is reduced to the citywide average.

Case 1: All Systems Accommodate Their Current Shares of Downtown Workers

According to surveys conducted for recent environmental impact reports, the public transit systems listed in Table 4-1 currently carry approximately 75 percent of downtown commuters. The proportion carried by each system is shown in Table 4-7. The table also shows the number of new workers that would ride each system, assuming that 28,630 new workers travel downtown each morning.

Table 4-8 compares the number of new workers expected to use each transit system to the available capacity on each system including planned expansions. The figures in Table 4-8 show that the total combined capacity expected to be available if current plans are carried out will be sufficient to accommodate the expected increase

TABLE 4-7

Commute Modes of Downtown Workers

Mode/System	Percent of Workers[1]	New Workers Expected
MUNI	27%	7,730
AC Transit	11	3,110
SamTrans	2	560
Southern Pacific RR	3	850
Golden Gate-Bus	7	1,970
Golden Gate-Ferry	2	560
BART-East Bay	14	3,960
BART-Daly City	10	2,820
Walk	3	850
Auto	22	6,220
TOTAL	100	28,630

Note: Detail may not add to total because of independent rounding.

[1]Distribution from San Francisco Department of City Planning, Final Environmental Impact Report, 456 Montgomery Street Building (EE 79.178), Table A-1 (page 153).

[2]Based on 28,500 new workers, the approximate number added by expected demand for office space.

Source: Gruen Gruen + Associates

in demand, but that commuters will have to change their current patterns of modal choice to make use of that capacity. For example, MUNI, SamTrans and Southern Pacific will all have capacity deficits if new workers have the same residence and mode preference patterns as current commuters; on the other hand, AC Transit, Golden Gate buses and ferries, and BART will all have still further capacity available if all planned expansions are implemented.

TABLE 4-8

Expected Future Capacity and Demand for Service on Public Transit Systems

System	Expected Available Capacity [1]	Expected New Demand [2]	Net Excess or (Deficit) Capacity
MUNI	0	7,730	(7,730)
AC Transit	6,105	3,110	2,995
SamTrans	460	560	(100)
Southern Pacific	0	850	(850)
Golden Gate-Bus	6,300	1,970	4,330
Golden Gate-Ferry	800	560	240
BART	16,000	6,780	9,220
TOTAL	29,665	21,560	8,105

[1] From Table 4-6.
[2] From Table 4-7.

Source: Tables 4-6 and 4-7.

If this case were to be carried to conclusion, a MUNI expansion would be hypothesized, and the 7,730 new commuters expected to ride MUNI would suffer no transportation cost increase because they would not have to shift to other systems. If no MUNI expansion is expected, however, this case is unrealistic.

Case 2: No MUNI Expansion

If MUNI does not expand to carry its current share (27 percent) of downtown workers, the new workers whose first choice would be MUNI will either drive to work or locate so that they can commute via other transit systems. Table 4-7 estimates that 7,730 of the 28,630 new downtown workers would seek to travel to work on MUNI. In Table 4-9, these workers are allocated to other systems, as capacity allows, in proportion to current patterns of use of the other systems. This allocation is equivalent to the assumption that (1) commuters who would have ridden MUNI if the additional capacity had been made available will locate their residences in approximately the same pattern as current commuters until available capacity on other regional transit systems is used up and (2) that they will continue to redistribute, proportionally, to take advantage of remaining capacity. Table 4-10 presents a calculation of the increase in commute costs required for the 7,730 workers to commute via modes other than MUNI. This calculation yields an estimate of the increase equal to $5,962,950, including a decrease in commute costs for would-be MUNI riders who choose to locate within walking distance of their jobs, and excluding the increase in parking costs for current drivers. If the increase in parking costs is included, the total estimated cost increase will be between $6,622,950 and $47,362,950.

TABLE 4-9

Redistribution of Demand for Future MUNI Service to Other Commute Modes

Mode	Percent of Workers Original	Percent of Workers Adjusted	Number of Workers
MUNI	27	0	0
AC Transit	11	15[1]	1,150
SamTrans	2	0[2]	0
Southern Pacific	3	0	0
Golden Gate - Bus	7	10	760
Golden Gate - Ferry	2	3	230
BART	24	36	2,750
Walk	3	4	310
Auto	22	33	2,530
TOTAL	100	100	7,730

[1] Available capacity absorbed by original distribution of 28,630 additional workers; no excess available to accommodate displaced MUNI riders.

[2] No available capacity (all capacity used in current commute conditions).

Source: Gruen Gruen + Associates

TABLE 4-10

Increase in Commute Costs for Future
Downtown Workers Not Accommodated by MUNI

Commute Mode	Number of Riders	New Cost	Old (MUNI) Cost	Increase in Cost
AC Transit	1,150	$ 496,800	$ 220,800	$ 276,000
SamTrans	0	0	0	0
Southern Pacific	0	0	0	0
Golden Gate - Bus	760	666,120	145,920	520,200
Golden Gate - Ferry	230	158,480	44,160	114,320
BART	2,750	1,525,330*	528,000	997,330
Walk	310	0	59,520	(59,520)
Auto	2,530	4,600,380	485,760	4,114,620
TOTAL	7,730	$7,447,110	$1,488,000	$5,962,950

*Assumes 41.7 percent of riders from Daly City and 58.3 percent from East Bay. Overall average fare is $1.0505.

Sources: Number of riders from Table 4-9;
fare assumptions from Table 4-3.

Case 3: MUNI Service is Reduced to the Current Citywide Average

If MUNI service to downtown were reduced from its current level to the citywide average, the 28,630 new workers would be joined by 30,557 travelers to downtown displaced from MUNI. Even if the regional residence pattern of downtown workers shifted to make maximum use of all expected capacity on Bay Area transit systems, there would not be enough room for all of those seeking to use transit. The commute pattern distribution of the new and displaced riders, adjusted to account for capacity constraints, is summarized in Table 4-11.

The impact of MUNI - that is, the redistribution of 7,730 workers not accommodated by expansions plus 30,557 workers displaced by service reductions - is shown in Table 4-12, and the transportation cost implications of this impact are summarized in Table 4-13. Table 4-13 indicates that if MUNI service to downtown were reduced, the commute costs of peak-hour travelers to downtown would be $38,300,360 higher than if service were expanded to meet estimated demand. As with the estimate for Case 2, this figure includes a reduction in costs for workers who would switch to walking and excludes increased parking costs for current drivers. If those parking cost increases were included, the total change in peak-hour transportation costs would be between $38,960,360 and $79,700,360.

TABLE 4-11

Adjusted Commute Pattern Distribution
of New Workers and Displaced MUNI Riders

Mode	Original Percent Distribution	Available Capacity	Added New + Displaced Workers
AC Transit	11	6,105	6,105
SamTrans	2	460	460
Southern Pacific	3	0	0
Golden Gate - Bus	7	6,300	6,300
Golden Gate - Ferry	2	800	800
BART	24	16,000	16,000
Walk	3	n.a.	3,245
Auto	22	n.a.	26,287
TOTAL		29,665	59,197

Note: Detail and totals may not agree because of independent rounding.

n.a. = not applicable.

Source: Gruen Gruen + Associates.

TABLE 4-12

Impact of MUNI Capacity Constraints
on Commute Patterns

Mode	Impact of Non-Expansion	Impact of Service Reduction	Total Impact
MUNI	- 7,730[1]	-30,557[2]	-38,287
AC Transit	1,150	1,785	2,935
SamTrans	0	0	0
Southern Pacific	0	0	0
Golden Gate - Bus	760	3,530	4,290
Golden Gate - Ferry	230	0	230
BART	2,750	6,050	8,800
Walk	210	2,075[3]	2,385
Auto	2,530	17,117[3]	19,647

[1] 7,730 riders not accommodated by service expansion.
[2] 30,557 riders displaced by service reduction.
[3] Excess workers not accommodated by any transit system allocated between walking and auto according to original distribution.

Source: Gruen Gruen + Associates

TABLE 4-13

Increase in Future Commute Cost for Downtown Workers Displaced or Not Accommodated by MUNI

Mode	Number of Workers	New Cost	Old (MUNI) Cost	Increase in Cost
AC Transit	2,935	$ 1,267,920	$ 704,400	$ 563,520
SamTrans	0	0	0	0
Southern Pacific	0	0	0	0
Golden Gate - Bus	4,290	3,760,100	823,680	2,936,420
Golden Gate - Ferry	230	158,480	44,160	114,320
BART	8,800	4,881,040	1,689,600	3,191,440
Walk	2,385	0	457,920	(457,920)
Auto	19,647	35,724,800	3,772,220	31,952,580
	38,287	$45,792,340	$7,491,980	$38,300,360

Source: Gruen Gruen + Associates.
Fare assumptions from Table 4-3,
number of workers from Table 4-12.

CHAPTER 5

TOTAL LOSS IN BENEFITS THAT WOULD RESULT FROM A REDUCTION IN MUNI SERIVCE

Chapter 1 of this report presented a theoretical discussion of land values, agglomeration, transportation costs and the benefit to downtown San Francisco property owners of MUNI service. Chapter 3 presented an estimate of the minimum portion of that benefit, which is the change in the cost of transportation to the downtown area that would occur if MUNI service were reduced.

This chapter discusses some of the unquantified benefits to downtown of the special level of MUNI service that it receives. The components of the total - quantified (minimum) plus unquantified - benefit are summarized in Figure 5-1. These components include minimization of the need for streets and parking facilities, high volumes of retail sales yielded by high accessibility, lower levels of congestion, maximization of potential land use density and facilitation of continued growth. The components listed may be grouped into two kinds of cost increases that would follow reductions in MUNI services: public costs and private diseconomies.

MINIMIZATION OF NEED FOR STREET IMPROVEMENTS: AN EXAMPLE OF PUBLIC COSTS

The special level of MUNI service provided to downtown San Francisco reduces the pressure on street capacities

FIGURE 5-1

TOTAL BENEFIT

Quantified benefit

\+ Customers' and clients' transportation costs

\+ Increased accessibility among businesses

\+ Lower levels of congestion

\+ Minimization of required streets and parking

\+ Maximization of density potential

\+ Maximization of feasible development intensity

\+ Facilitation of continued growth

Source: Gruen Gruen + Associates

and parking facilities that would result if more workers, customers and clients traveled to the area in private automobiles. The benefit associated with this reduction may be approximated by estimating the costs of providing the improvements to streets needed to accommodate the additional automobiles that would be driven to the downtown area each day. While extensive studies would have to be completed to indicate precisely which streets and intersections would have to be modified to allow traffic to continue to move during the peak hour and precisely what the associated costs would be, the need for those modifications is readily apparent.

PRIVATE DISECONOMIES: MORE PARKING FACILITIES, INCREASED CONGESTION AND THE DECLINE OF DOWNTOWN SAN FRANCISCO

The special level of MUNI service to downtown also reduces the need for parking facilities that must be provided to accommodate travelers to downtown. In Chapter 3, it was estimated that 20, 371 parking spaces would be required to accommodate cars used by 30,557 peak hour MUNI riders. At the configuration assumed (350 square feet per space), these parking facilities would occupy 7,129,850 square feet of building space within the downtown agglomeration. The most tangible and readily quantifiable cost of providing these facilities is the loss in revenue that landowners would suffer if they were forced to devote that amount of land to parking rather than office or retail use. The parking structures would rent for $2,455 per year, or about $7.00 per square foot.

This rent may be compared to average office rents of $29.00 per square foot per year and average retail rents of $14.00 per square foot per year in downtown San Francisco. While these figures are not strictly comparable because the treatment of operating costs is not explicit, they do give an indication of the magnitude of income that would be lost if 7,129,850 square feet of downtown building space were devoted to parking rather than other commercial uses.

The less tangible, less quantifiable cost of the need for these parking facilities relates to the character of the agglomeration itself. The location of parking facilities within the agglomeration reduces both the intensity of land use and the accessibility among uses. As more parking facilities are built, distances between and among offices, stores, restaurants, hotels and their support services and industries become greater and the value of the cluster is diminished. Walking trips are less efficient, luncheon meetings are more difficult to arrange, comparison shopping is more difficult to undertake. Hotels lose their advantages because motorized transportation from hotel to business destination becomes necessary to cover the increased distances; industries linked to downtown businesses also lose their advantages for similar reasons.

Still more difficult to quantify is the impact of downtown congestion on the attractiveness of San Francisco to both new business and businesses already present. It was

shown in Chapter 1 that the business firm's decision to locate downtown reflects a trade-off between the benefits of accessibility and the costs of land (or building space) rents and congestion in the center of the agglomeration. If the congestion in the area becomes too severe, accessibility to both workers and shoppers diminishes. Businesses seeking to locate in San Francisco are then likely to reconsider their positions and seek locations outside the CBD, where the "sum" of land prices and congestion costs is lower than it is in the downtown area. This phenomenon is beginning to become apparent now in the Bay Area, as virtually every month brings the announcement of new plans for office development in Walnut Creek, Concord, Livermore, San Ramon and other areas.

As the costs of doing business downtown remain high and congestion there increases, the suburban locations become relatively less expensive and less inconvenient, and become increasingly attractive even to firms that are already located in downtown San Francisco. As their current leases expire, firms whose functions are not critically dependent on a downtown San Francisco location will look more favorably on a move out of the city, where rents are lower and employee access is easier. Even firms whose main functions <u>are</u> critically dependent on downtown locations will look to move auxiliary and support functions out of the city to minimize costs. This dynamic is illustrated by Figures 1-8 and 1-9 (pages 37 and 38).

It is this slowing of growth and loss of current businesses that is the great potential cost of a decrease in MUNI service to downtown. A decline in the demand for building space - or a failure of demand increases to keep up with increases in the supply of building space - will reduce the obtainable rents in downtown San Francisco, thereby reducing land values. It is possible that, over time, high levels of congestion would neutralize the benefits of proximity afforded by a downtown location. If this situation were to occur, both demand and obtainable rents would fall to a low enough level that they would not cover the operating costs of some buildings. These buildings would then be taken off the market - removed from the available supply - and the potential size of the agglomeration would shrink. In addition, decreased demand and the resulting lower level of obtainable rents would decrease the prospects for new growth in the area. The interactive effects of agglomeration that once acted to benefit downtown will, at this stage, have turned against it.

CHAPTER 6

BASIS FOR AN ASSESSMENT TO RECAPTURE THE SPECIAL BENEFIT

The first five chapters of this report address the nature and amount of special benefit conferred by MUNI on downtown property owners. Chapter 3 presents an estimate of the readily quantifiable portion of that special benefit: the current transportation cost savings of $50,354,959 to downtown-bound travelers during the morning peak period. This chapter addresses the approach recommended to be used to levy a special assessment on landowners in the special benefit area, as outlined in Figure 2-6.

Historically, there have been two most-frequently used approaches to assessment in special benefit districts. One has been to assess on the basis of property value. With this approach, properties that receive the greatest increase in value are assigned the greatest assessment levies. This approach, however, is unworkable in California because Article XIII-A of the California Constitution (Proposition 13) prohibits the imposition of new value-based levies.

The other approach is to assess on the basis of some physical characteristic of the property that is benefited. In this case, a reasonable approach would be to levy the assessment as a fee per square foot of floor area. This method has several advantages. First, it distributes the fee proportionately among properties according to the

densities at which they are developed; thus, the more-intensively developed sites, which receive greater benefits, pay higher fees while the less-intensively developed sites, which receive relatively less benefit, pay lower fees. Second, it focuses on actual intensity of current use, - and, therefore, actual benefit - rather than potential intensity of use, which would determine potential benefit and is more open to speculation.

The equation that would be used to implement this assessment approach is straightforward:

$$\text{Assessment levy for specific property} = \frac{\text{Total benefit}}{\text{Total sq. ft. of floor area in district}} \times \text{Total sq. ft. of floor area on specific property}$$

Because an assessment based on square feet of floor area is a levy on current land use rather than potential use, it minimizes the likelihood that a small or marginal user will be displaced by the assessment levy. It could nevertheless adversely affect some of those types of firms located in the defined benefit area that may not be closely linked to the downtown agglomeration or which might be forced to move should rents be increased to cover the assessment. While the theory of urban land economics suggests that in the long run the assessment levy could not be passed on to renters, it is possible that, in the short run, lease terms and psychological factors could result in some rental increases or changes in use.

We see two possible approaches to mitigating such impacts. One approach is to constrict the boundaries of the benefit area so that the area is limited to include only properties that unarguably benefit from the special level of MUNI service. This approach would probably limit the special benefit area to the C-3-O zoning district, and would have the effects of (1) significantly increasing the assessment per square foot of space within the smaller district and (2) leaving some clearly benefited properties unassessed.

The second approach is to leave the boundaries of the district as defined in Figure 2-6 and to subtract an amount equal to the basement and ground floor space from the square footage to be assessed. This approach is designed to eliminate the marginal, non-downtown-linked uses from inclusion in the assessment. Although it (the second approach) also eliminates basement and ground floor uses that <u>are</u> linked to the downtown agglomeration, it retains more building space in the computation and therefore increases the assessment per square foot by a lesser amount that does the first approach. Under the circumstances, it appears that the most equitable method of allocating the cost of downtown MUNI operating costs among benefited properties is this modified square footage approach.

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